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AN

INTRODUCTION

TO

GEOGRAPHY

AND

ASTRONOMY.

LONDON:
GEORGE WOODFALL AND SON,
ANGEL COURT, SKINNER STREET.

AN

INTRODUCTION

TO

GEOGRAPHY

AND

ASTRONOMY,

WITH

THE USE OF THE GLOBES.

BY E. AND J. BRUCE.

TENTH EDITION,

CONTAINING, BESIDES OTHER ADDITIONS AND IMPROVEMENTS,

AN EPITOME OF ANCIENT GEOGRAPHY,

BY THE REV. J. C. BRUCE, A.M.,

WITH THE ADDITION OF THIRTY WOODCUTS ILLUSTRATIVE OF THE
CONSTELLATIONS, ASTRONOMICAL PHENOMENA, AND
OTHER PORTIONS OF THE WORK.

LONDON:
SIMPKIN, MARSHALL, AND CO.

1846.

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BIBLIOTHECA · BODLEIANA ·

PREFACE

TO THE TENTH EDITION.

THE foundation of every system of Geography ought to be an exhibition of the natural features of the surface of the earth. The political condition of countries is constantly varying, their physical aspect is comparatively permanent. The details of physical geography are peculiarly valuable to the youthful student, as tending to nurture a spirit of rational inquiry, and as exhibiting much of that harmony which subsists amongst the several parts of the material universe. This principle has been steadily kept in view in the preparation of the various editions of this work.

But whilst a survey of the natural features of the globe must form the groundwork of geographical knowledge, the results of the efforts of man are too important to be summarily dismissed. In the following work the boundaries of the great political divisions of the earth are described, the position and peculiar features of the most important towns and cities are indicated, and a condensed view of the commerce, the government, the religion, and the character of each principal community is given.

Those who have previously used the book will find that considerable additions have been made to it. The list of towns appended to each country has in nearly every instance been extended, the account of South America has been made more complete, and numerous notices of interesting facts in history, biography, botany, and zoology, have been inserted, with the view of exciting the attention of the youthful pupil, and suggesting to the teacher profitable subjects of oral instruction.

No alteration has been made upon that part which treats of the terrestrial and celestial globes ; extensive experience having proved the previous completeness of that portion of the subject.

Important additions have been made in the department of descriptive astronomy. Notices of the nebulæ, double stars, and comets will be found, together with much valuable matter that did not appear in former editions.

Numerous wood-cuts have been inserted to elucidate several parts of the work, particularly that portion relating to the siderial heavens. Too little attention is, in most schools, paid to the acquisition of a knowledge of the stars. The assistance which is now furnished will, it is hoped, induce some to make the attempt.

An Epitome of Ancient Geography, as copious as the limits of the work would allow, has been added to this edition. In those cases where it is not thought necessary to require the pupil to commit this part to memory, the careful perusal of it, with constant reference to a good map, will be attended with considerable advantage.

Newcastle-upon-Tyne,
Oct. 10, 1845.

CONTENTS.

PART I.

Definitions, Page 1.—Of the Earth in general, 2.—Geographical Discovery, 8.

Europe.—General View, 10.—England, 17.—Scotland, 56.—Ireland, 69.—Denmark, 83.—Sweden and Norway, 87.—Russia, 90.—France, 95.—Holland, 102.—Belgium, 107.—Switzerland, 109.—Germany, 112.—Austria, 116.—Prussia, 118.—Secondary German States, 121.—Spain, 125.—Portugal, 130. Italy, 131.—Turkey, 138.—Greece, 142.

Asia.—General View, 144.—Turkey in Asia, 147.—Russia in Asia, 152.—Arabia, 155.—Persia, 157.—Tartary, 159.—China, 161. —Hindostan, 164.—India beyond the Ganges, 169.—Isles of the Pacific, 170.

Africa.—General View, 173.—Barbary States, 176.—Region of the Nile, 177.—Western and Central Africa, 179.—Eastern Africa and Madagascar, 180—Southern Africa, 181.

America.— General View, 182.— British America, 187. — United States, 189.— Mexico, 193. — South America, 194.—West Indies, 199.

PART II.

PROBLEMS ON THE TERRESTRIAL GLOBE.

Section I.—Problems I. to VI., on Latitude and Longitude, 203.

Section II.—Problems VII. to XI., respecting Antœci. Periœci, Antipodes, &c., 212.

Section III.—Problems XII. and XIII., respecting Time, 220.

Section IV.—Length of Days and Nights, 228. Problems XIV. to XXI., respecting the Sun's Place in the Ecliptic, Declination, Rising and Setting, Altitude, &c., 230.

SECTION V.—Of the Appearance of the Sun in the several Zones, Page 241. Problems XXII. to XXIX., respecting the Appearance of the Sun in the Zones, 244.

SECTION VI.—Of Twilight, 254. Problems XXX. to XXXII. 255.

PART III.

PROBLEMS ON THE CELESTIAL GLOBE.

DEFINITIONS, 257.

SECTION I.—Of the Stars, 261.—List of Constellations, 262.—Of the Number of the Stars, 265.—Of temporary and double Stars, 268.—Of Nebulæ and clusters of Stars, 270. Problems I. to XIII., relating to the Stars, 271.—A Survey of the Starry Heavens, 283.

SECTION II.—Of the Sun, 298. Problems XIV. to XX., respecting the Sun, 300.

SECTION III.—Of Planets and Comets, 307.—Kepler's Laws, 309.—Mercury, 309.—Venus, 310.—The Earth, 311.—The Siderial and Equinoctial Year, 312.—The Moon, 313.—Mars, 315.—The Asteroids, 315.—Jupiter, 316.—Saturn, 318.—Uranus, 318.—Comets, 320. Problems XXI. to XXIII., respecting the Planets, 321.

SECTION IV.—Problems XXIV. to XXX., relating to the Moon, 323.—Eclipses, 324.

TABLE of the Latitude and Longitude of Places named in the Problems, 335.

TABLE of Sun's Declination and Right Ascension, &c., 343.

PART IV.

AN EPITOME OF ANCIENT GEOGRAPHY.

Europa, 348.—Asia, 354.—Africa, 356.

AN

INTRODUCTION

TO

GEOGRAPHY AND ASTRONOMY,

ETC.

PART I.

DEFINITIONS.

GEOGRAPHY is a description of the earth.—The surface of the earth contains *land* and *water*. The great collections of water are called *oceans*, the smaller *seas*.

A *bay* or *gulf*, is a part of the sea running into the land; as, the *Bay of Biscay*, the *Gulf of Venice*.

A *strait* is a narrow part of the sea running between two countries, and connecting two seas: as the *Strait of Dover*, the *Strait of Gibraltar*, &c.

A *lake* is a considerable body of inland fresh water; as the *Lake of Geneva*, *Lake Ontario*, &c.

A considerable stream of inland water, which runs into the sea, is called a *river*.

The expansion of a river into an arm of the sea is termed an *estuary*.

A very great extent of land is called a *continent*.

An *island* is an extent of land surrounded by the sea; as *Great Britain*, *Jamaica*, &c.

A *peninsula* is a tract of land nearly surrounded by water. Where it is joined to some other land by a narrow neck, this is called an *isthmus.*

A *promontory* is a point of land stretching far into the sea, the end of which is called a *cape;* as the *Cape of Good Hope.*

OF THE EARTH IN GENERAL.

The form of the earth is that of a globe flattened at the poles.

That the earth is a globe is proved by the following facts:—1st, As a vessel at sea approaches, the upper part of its rigging is seen before the hull becomes visible. 2nd, The shadow of the earth, as seen on the moon during an eclipse of that body, is circular. 3rd, Navigators have often sailed round the earth.

The circumference of the earth is about 25,000 miles, its diameter is nearly 8000 miles. Its surface contains nearly 197,000,000 square miles.

The equatorial diameter exceeds the polar by 26 miles. The force acquired by the earth's revolution upon its axis is necessarily greater at the equator than at the poles—hence it is, that whilst the earth is flattened at the poles, it swells out at the equator.

The earth is divided into four quarters, Europe, Asia, and Africa, forming the eastern hemisphere or old world; and America constituting the western hemisphere or new world.

The three old continents are united together, but what approach America makes to Asia across the North Pole, is not yet accurately ascertained.

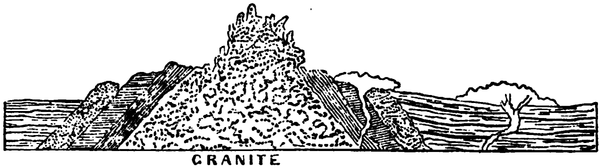
More than two-thirds of the earth is covered with water. The largest of the oceans, the Pacific, is between Asia and America; the Atlantic separates America from Europe and Africa; the Indian ocean is to the south of Asia.

The dry land, whether consisting of islands or continents, can only be considered as so much of the rough surface of the globe as happens to have an elevation sufficient to raise it above the level of the waters. By far the largest portion is in the northern hemisphere. The greatest depth of the ocean is not known, but its valleys do not probably descend *below the surface* of the sea further than the mountains rise above it, *that is, about four miles.* The ocean is of incalculable value to man—

it furnishes a large supply of food, it renders distant places easily accessible, it purifies the air and regulates its temperature, and supplies the clouds with rain. The salt which is mingled with the water of the sea renders it more buoyant and less liable to freeze or to putrefy.

OF MOUNTAINS, CLOUDS, AND RIVERS.

Of the solid contents of the globe we know little, having but as it were scratched its surface. So far as has been observed, it consists of many distinct layers or strata of rocks of different kinds. These strata do not always lie in a horizontal position, but are in many places very much convulsed. Mountains are nothing more than elevations of these strata which seem to have been thrust up by some mighty force from beneath.



Stupendous as is the bulk of the mountain ranges which diversify the face of the earth, their size is as nothing in comparison with the bulk of the whole globe, being in the proportion of a grain of very fine sand to a common artificial globe.

Granite is the rock which forms the lowest known mass, yet it has not only upheaved the strata lying upon it, but has burst through them, and forms the summit of the lofty Alps and other mountains.

These irregularities of strata bring within the reach of man the materials that he applies to architectural purposes, and minerals, such as coal and iron, which would otherwise have been inaccessible.

By the action of the surrounding atmosphere, and the sun's rays upon the oceans and seas, large quantities of pure water (the salt and other ingredients being left behind) are taken up into the air in the form of vapour, which is invisible at first, but afterwards collecting in considerable masses, is suspended in the heavens, and constitutes the clouds that we see almost continually above us.

The water of the clouds is not in the state of very minute drops, but of little *vesicles hollow within.*

When the moisture of the atmosphere is condensed by a cold wind, or the clouds are made to collapse by the discharge of their electricity, as in a thunder-storm, the vapour now formed into drops falls to the earth by its own weight in showers of rain, or if frozen, of snow or hail.

At the equator the heat is greatest, so that here the evaporation is greatest, and hence the quantity of rain is most abundant; the quantity diminishes as we approach the poles, but the number of rainy days increases; for whilst in hot climates the rain, when it does fall, comes down in torrents, as you approach the colder, the showers are less copious, and hence of longer continuance. All the water which is incessantly pouring into the Caspian and some other seas, is taken off by evaporation.

The water which has fallen on the ground, after moistening its surface, or penetrating the strata and again appearing as springs, seeks by its own weight the lowest level, and first in brooks, and then in rivulets and rivers, once more reaches the ocean: thus the waters of the globe are kept in constant circulation.

Mountains act an important part in the formation of rivers. They attract and condense the clouds, and thus feed the sources of the rivers with never-failing supplies. The loftiest mountains generally give rise to the largest rivers; thus the Andes give rise to the Amazons. You may easily ascertain the highest part of a country by observing where rivers having nearly a common origin run in opposite directions—thus the Rhine and the Rhone indicate the Alps as the highest ground in Europe. When a river runs through a country that has a considerable descent, its course is rapid and generally direct, but when it traverses a flat country it pursues a slow and meandering course, its stream is divided by trifling obstacles, and if this should take place near the sea, it enters it by several mouths. Those rivers which overflow their banks receive their periodical excess of waters from the melting of the snows on the high grounds where they have their source, or from the immense quantities of rain which fall in tropical countries during the wet seasons.

OF THE ATMOSPHERE AND CLIMATE.

The atmosphere which surrounds the globe is about 45 *miles* high, and at the surface of the earth, which is in *reality the bottom* of a great aerial ocean, presses upon us at the rate of 15 pounds per square inch. But its density diminishes very rapidly as you ascend. The air is necessary both to vegetable and to animal life; and it is air in motion, whether gentle or more impetuous, that constitutes wind—the zephyr or the hurricane. Air is so thin a substance that it is very easily disturbed; hence in many parts of the globe winds blow without any regularity, just as they are at the moment impelled by temporary and local causes. But over a large tract of the earth the currents of the atmosphere are constant; in this case, they are called trade-winds.

The trade-winds depend upon one of the two following causes:—the unequal temperature of the equator and the poles, and the earth's motion upon its axis. When the door of a room in which a fire burns is opened, the cold air from without rushes in at the bottom, whilst the hot air, being lighter, makes its escape at the top. The same thing takes place on a large scale on the earth—the cold air of the polar regions finds its way to the equator, whilst the warm and light air of the equator supplies its place. The rush of cold air from the north is generally most impetuous in the spring, in consequence of the accumulation of a winter's cold; hence the storms experienced in this country at the time of the vernal equinox, generally from the north-east. The accumulation of a summer's heat in torrid climes causes a similar rush of air from the equator to the poles in autumn. When the northern current passes over our island, it seems to blow from east as well as north. The reason is, that whilst it is travelling due north and south we are moving from west to east. The two motions united give a wind from the north-east. When within 28 degrees of the equator, the increasing rapidity with which the surface of the globe moves near the line, aided by local causes, apparently annihilates the northern direction of the current, and the wind is nearly due east. It is here that the trade-winds are said to begin. From this point the wind gradually acquires the motion of the earth—it takes a northerly direction, and when it approaches the line it seems to blow due north. The currents from the South Pole obey the same laws.

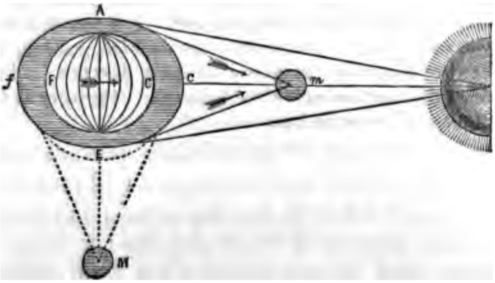
A great diversity of temperature prevails over the globe. The greatest degree of natural cold ever observed is—58° (or 90° below the freezing point); this was in the Esquimaux country of North America; at Benares, on the other hand, the thermometer has been observed as high as 120 degrees and upwards. In general the climate of the regions in the torrid zone is hottest, the temperature diminishing as we depart from it; because the sun's rays fall perpendicularly or nearly so on the torrid zone, but reach the countries that are on each side of it aslant, and so being spread over a larger surface cannot be so concentrated in any one spot.

But a variety of causes modify this general law. 1. The neighbourhood of the sea greatly moderates the cold of winter and the heat of summer. 2. The elevation of the ground greatly affects climate; thus, at an elevation of 15,000 feet above the sea you will have perpetual snow, even at the equator. 3. The length of the day, and the almost total absence of night during a part of the year in high latitudes, cause an accumulation of the sun's rays, which renders their short summers exceedingly hot. Their long winters are correspondingly cold. 4. The clearness of the sky in hot climates, if it fail to intercept the sun's rays by day, allows the warmth of the earth to escape by radiation at night: cold is by this means produced in some parts of India sufficient to freeze water. In Britain and other temperate regions, the clouds which commonly prevail intervene to prevent the warmth that we ill can spare from shooting off into the unbounded vault of the sky.

OF TIDES AND CURRENTS.

The ocean is subject to periodical elevations called tides. These are occasioned by the attraction of the moon and the sun.

At the same time that the earth by the principle of attraction draws the moon to it, the moon, in proportion to its bulk, draws the globe



with all its contents out of its orbit towards itself, (as at C). That part of the surface of our orb which is nearest the moon will feel its attractive influence most, and be most powerfully drawn towards the moon; the central part will also be attracted, but in a less degree, and the most remote will experience it least of all. The moon exercising this unequal attraction upon the earth, will draw towards it, in the form of a huge wave, (as at F,) that part of the ocean which is directly opposed to it, whilst it leaves the ocean on the opposite side also in the form of a huge wave (highest in the centre) lagging as it were behind, (as at A and E). Thus the approach of the moon and its removal both produce the same effect, the elevation of the waters above their natural level. To supply this accumulation of waters at these two opposite points, the parts between are deprived of their usual portion, and it is low water at these places. In the course of 24 hours, 50½ minutes, each successive portion of the earth's circumference is presented to the direct influence of the moon, it will therefore be high water at each place twice in that period, or once in 12 hours 25¼ minutes. At new and full moon tides higher than usual, called spring-tides, take place. At these periods the sun and moon are in the same line, (C, M, S,) with respect to the earth, and the attractive force of both is combined in raising the waters of the ocean. At new moon the moon and sun are on the same side, but at full they are on opposite sides of the earth.

At intermediate periods between new and full moon the sun is at right angles with the moon, (as when the moon is at M,) and is using his attractive force to elevate where the moon's influence is diminishing the height of the waters. The lowest or neap tides take place at these periods. The ocean wave is most elevated at the equator, the point nearest the disturbing luminaries, hence the tides, when flowing, run from the line northward and southward to the poles. In the great oceans the water is not elevated more than a foot above the low water level, but in bays and confined channels much more; at Bristol the elevation is sometimes 50 feet, in the bay of Fundy 120 feet. Those seas that have little or no communication with the ocean have little or no tides.

There is besides, from the same cause that produces trade-winds, the difference of the temperature of the equator and poles, a constant circulation of the waters of the sea. A great current is observed to set from the poles north and south towards the equator, and preserves its direction for a long space. It is owing to this cause that floating masses of ice are frequently found in the temperate seas. Captain Parry attempted to reach the North Pole by traversing the intervening fields of ice by means of sledge-boats and rein-deer, but the southerly progress of the ice drifted by this current was so great as to render his labour nugatory. In the vicinity of the equator the great oceanic current assumes a westerly course, owing to the motion of the earth in an opposite direction. In the Atlantic the western current flows steadily from the Canaries to the east coast of America, it sweeps round the Gulf of Mexico, and then flows northward till it reaches the south side of the great bank or shoal of Newfoundland, when it turns westward and runs to the Azore Islands, and is even felt in the west of Europe. The water of this current being heated in the torrid zone cools so gradually that it continues throughout its course warmer than the water which surrounds it. In the Pacific the current, leaving the coast of Peru, sweeps on in a westerly direction until it strikes against New Holland, when it divides into several streams, the effects of which are felt on the shores of Madagascar, at the Cape of Good Hope, and in the Bay of Bengal.

OF THE INHABITANTS OF THE EARTH.

The number of human beings that inhabit the earth is very uncertain; they probably amount to 950,000,000.

The average duration of man's life is 30 years, one individual therefore dies at this rate every second.

PROGRESS OF GEOGRAPHICAL DISCOVERY.

The Geography of the ancients was very imperfect. In the days of Homer the earth was conceived to be a circular plain, surrounded by the ocean; on this ocean, they asserted, the vault of the sky rested. The Phœnicians were the great navigators of antiquity; but from motives of jealousy they concealed their discoveries. Herodotus, who flourished 450 B.C., found it necessary to visit the countries which he describes. His account of Egypt, Asia Minor, Babylon, and the neighbouring countries is accurate; but of other portions of the globe, he and his contemporaries were quite ignorant. The expedition of Alexander, the Macedonian conqueror, extended the knowledge of Asia as far as the Indus. Pythias, of Marseilles, about the same time, passed the straits of Gibraltar, explored the west of Europe, and got as far north as an island which he calls Thule, supposed to be one of the *Shetland* Islands (hence the phrase *ultima Thule*). The northern countries of Europe,—China and Tartary, and Africa, south of the Mountains of the Moon,—the ancients never explored. The invention of the mariner's compass, in the beginning of the 14th century, gave a powerful stimulus to commercial enterprise. Nicholas Lynn, a friar and astronomer, of Oxford, is said to have been the first person who trusted himself to the guidance of the needle. Important discoveries quickly followed. In 1472, the equator was first crossed. In 1485, Bartholomew Diaz reached the Cape of Good Hope, (he called it, *Cabo-tormentoso*,) but was unable to double it. In 1497, Vasco de Gama doubled the Cape, and reaching India by this passage, gave a new direction to the commerce of Europe. On Oct. 12th, 1492, Columbus discovered the New World, the island of San Salvador was the first land he made. Magellan passed through the straits that bear his name in 1519; this was the first time that a European vessel had floated on the Pacific. Captain Cook's three voyages, made between 1768 and 1780, rendered our knowledge of the globe nearly complete; a vast continent had been supposed to encompass the South Pole—this he found was not the case.

QUESTIONS FOR EXAMINATION.

OF THE EARTH IN GENERAL.

What is Geography? What is the form of the earth? What is its circumference? Its diameter? How much is covered with water? Name the great oceans. How are they situated? What is a bay or gulf? What is a strait? What is a lake? Name the four quarters of the globe. How many are in the Eastern hemisphere? What is an island? What is a peninsula? What is a promontory? Which is the hottest part of the earth? Which the coldest?

Give some proofs of the rotundity of the earth. How much does the equatorial exceed the polar diameter? What force may account for this excess? What valuable purposes does the ocean serve? Explain the formation of clouds. Where does most rain fall? How do mountains assist in the formation of rivers? How may you ascertain the most elevated part of a country? What is the height of the atmosphere? What are trade winds? On what two circumstances do

they depend? Besides latitude what circumstances modify climate? What heavenly body chiefly causes tides? How often is it high water? Explain the origin of the gulf stream? Describe its course.

Who were the great navigators of antiquity? What invention led to the modern discoveries? Who first doubled the Cape of Good Hope, and when? When did Columbus discover America? Who first sailed on the Pacific? What was the object of Cook's investigations in the South Pacific?

EUROPE.

Europe is the smallest of the four great divisions of the world. It is situated between 10 degrees west and 60 degrees east longitude, and 36 degrees and 71 degrees north latitude. Its length is about 3,300 miles, its breadth 2,350. It is bounded on the north by the Frozen Ocean,—on the east by Asia,—on the south by the Mediterranean, which divides it from Africa,—and on the west by the Atlantic Ocean.

STATES OF EUROPE.

There are in Europe ninety independent states; the chief are, four in the north, five in the middle, and five in the south.

The four in the north are,

British Isles,	London, on the river Thames.
Danish dominions,	Copenhagen, on the Sound.
Sweden and Norway,	Stockholm, on lake Mæler.
Russia,	St. Petersburg, on the r. Neva.

Five in the middle.

France,		Paris, on the river Seine.
Holland,		Amsterdam, on the r. Amstel.
Belgium,		Brussels, on the r. Senne.
Switzerland,		Zurich, Berne, and Lucerne.
Germanic States.	Austria,	Vienna, on the r. Danube.
	Prussia,	Berlin, on the r. Spree.
	Saxony, Bavaria, Hanover, Wirtemburg, and other smaller States.	

Five in the south.

Spain,	Madrid, on the river Manzanares.
Portugal,	Lisbon, on the r. Tagus.
Italian States,	Rome, on the r. Tiber.
Turkey,	Constantinople, on the strait of Constantinople.
Greece,	Athens, near the gulf of Egina.

SEAS.

Europe is characterised by the number and extent of its inland seas, which give it, in proportion to its size, a longer line of coast than any other continent. The Mediterranean is the largest inland sea in the world; it is connected with the Atlantic by the Strait of Gibraltar. Indenting the coast of France and North Italy, it forms the Gulfs of Lyons and Genoa, and in South Italy the Gulf of Taranto. The Gulf of Venice, or Adriatic Sea, is between Italy and Turkey. The eastern part of the Mediterranean is called the Levant.

Besides receiving the waters of the Ebro, Rhone, Po, and Nile, water continually passes in through the Straits of Gibraltar from the Atlantic, and a strong current sets west through the Dardanelles from the Black Sea.

The Mediterranean Sea is nearly destitute of tides. It is denominated in Scripture the Great Sea. Many of the great nations of antiquity were nurtured on its shores,—the Roman, the Grecian, and the Macedonian;—the Trojan, the Tyrian, and the Israelitish;—the Egyptian, and the Carthaginian.

The Archipelago, which is thickly studded with islands, is an offset from the Mediterranean. It communicates by the Dardanelles (the ancient Hellespont) with the small Sea of Marmora, and this again is united to the Black Sea by the Strait of Constantinople, the ancient Bosphorus.

The word Archipelago, which is frequently used as a common substantive to denote a sea studded with islands, is a corruption of the Greek name of the sea, *Aigaion Pelagos*, Ægean Sea.

The Euxine or Black Sea is 690 miles long and 360 broad, and receives by the Strait of Kaffa or Jenikale the turbid waters of the Sea of Azof.

The Bay of Biscay, remarkable for its heavy swell, is an extensive inlet of the Atlantic between France and Spain.

The North Sea or German Ocean, is severed from the rest of the Atlantic by the British isles. The British Channel, between England and France, communicates with the North Sea by the Strait of Dover. The Irish Sea, the south-part of which is called St. George's Channel, is between England and Ireland.

The Baltic, the East Sea of the Germans, is a large arm of the German Ocean, with which it communicates by a narrow winding channel, called the Skager-rack and the Kattegat. The Gulf of Bothnia is a prolongation of the Baltic northwards, the Gulfs of Finland and of Riga branch out to the east.

The Baltic is subject to severe storms, and the navigation is dangerous. Its tides are scarcely perceptible. Its waters are less salt than those of the Ocean. For three months in winter it is frozen over, and sometimes so completely as to admit of a passage on foot from Sweden to Finland.

An arm of the Arctic Ocean, denominated, from its frozen appearance, the White Sea, penetrates the north of Russia.

MOUNTAINS.

The loftiest of the European ranges is the Alps, which reach an elevation in Mount Blanc of 15,730 feet, nearly three miles. Tracing them from the shores of the Mediterranean near Nice, they pursue a semicircular course for about 600 miles to the head of the Gulf of Venice. Under various names the chain is continued along the eastern coast of the Adriatic, until dividing into two branches,—the one, the Hœmus or Balkan range, terminates on the shores of the Black Sea; the other, the Pindus chain, makes its way to Greece, and gives rise there to the celebrated summits of Parnassus, Helicon, &c.

The Apennines run through the whole extent of Italy, and, though interrupted by the Strait of Messina, of Sicily also.

The Apennines scarcely reach the limits of perpetual congelation, the highest point being about 9,500 feet high.

Associated with the Alps is another chain, which stretching from the banks of the Rhine right across Germany, and circling Hungary, eventually joins the Balkan range. The German part of this range is called the Hercynian mountains, though it also bears various local names, as the Black Forest, the Giant, the Hartz mountains; in Hungary it is denominated the Carpathian.

The mountain range of Sweden, called the Langfiel and Dofrefiel, &c., mountains, the Ural mountains to the east of Russia, and the Pyrenees between France and Spain, are distinct and independent chains.

VOLCANOES.

The principal volcanoes of Europe are,—Mount Etna, in Sicily, whose base covers 180 sq. miles, and whose height is 10,870 feet; Mount Vesuvius, east of Naples, which is about 3,600 feet high; and Mount Hecla, in Iceland, upwards of 5,000 feet above the level of the sea.

By the eruption of Vesuvius, A.D. 79, (the first on record,) the cities of Pompeii and Herculaneum were entirely destroyed.

Volcano and Strombŏli are interesting volcanic islands in the Lipari group. Strombŏli is 2,000 feet high, and is the least elevated known volcano; it has been in a state of activity from the earliest ages.

LAKES.

The principal lakes are,—Onega and Ladoga, in Russia; Wener and Wetter, in Sweden; Geneva, Constance, and Neufchatel, in Switzerland.

RIVERS.

The principal rivers in Europe are,—the Wolga, after draining the extensive provinces of central Russia, directs its course to the Caspian Sea, into which it throws its immense volume of water.

The Danube ranks second among European rivers: it rises from the declivities of the Black Forest mountains. Situated between the Hercynian and Carpathian chain on the north, and the Alps and Hœmus on the south, it receives all the waters that flow from their lofty summits, and running through Germany, Austria, and Turkey, it empties itself, by several mouths, into the Black Sea.

The Dnieper also falls into the Black Sea.

The Don falls into the Sea of Azof.

The Rhine carries the waters of Switzerland and Western Germany to the German Ocean.

The Rhone, rising in the immediate vicinity of the Rhine, pursues an opposite direction and falls into the Gulf of Lyons.

The Loire, the largest river in France, traverses the centre of that country, and runs into the Bay of Biscay.

The Elbe falls into the North Sea; the Oder, the Vistula, and Dwina, run into the Baltic; another Dwina falls into the White Sea.

Taking the length of the Thames as 1, the length of the Wolga is 10, the Danube upwards of 8, the Dnieper and Don 5½, the Dwina (White Sea) 4½, and the Rhine 3½. But as the longest rivers are generally the deepest and broadest, the Wolga probably discharges 30 times as much water into the sea as the Thames.

ISLANDS.

The principal islands of Europe, besides Great Britain and Ireland, are Iceland, in the North Atlantic; and Sicily, Sardinia, and Corsica, in the Mediterranean.

PENINSULAS, CAPES, ETC.

The varied outline of Europe presents us with many peninsulas, &c. Spain and Portugal are often called by way of eminence the Peninsula. Sweden and Norway form the Scandinavian Peninsula. The Morea, united to the main-land by the isthmus of Corinth, and the Crimea, by the isthmus of Perecop, are peninsulas. Continental Denmark and Italy come under the same denomination.

It is a remarkable fact, that all the principal peninsulas in the world point southward; Jutland is one of the very few exceptions, and it is a low flat country, composed of sand and other alluvial matter.

The North Cape is the most northerly point of Europe; Cape Roca, in Portugal, the most westerly; and Cape Matapan, in the Morea, the most southerly.

CLIMATE AND PRODUCTIONS.

Europe is situated, except a small portion towards the north, in the temperate zone, and enjoys a corresponding climate.

The eastern part is generally colder than the western, owing to its connexion with the extensive and lofty plains of Asia. The blasts of Siberia are uninterrupted in their course until they encounter the ranges associated with the Alps. The winds from the burning deserts of Africa are tempered in their passage across the Mediterranean, notwithstanding the sirocco is still felt to the south of the Alps. The vicinity of the Atlantic and Northern Oceans, with their bays and gulfs, renders the western and northern parts of Europe temperate, though moist. The vine is cultivated in any exposure, under the parallel of 45 degrees north; the cultivation of the hop extends to the 60th degree; and of the different kinds of grain, as of barley and oats, in Norway, to the 70th degree; whilst in the opposite coasts of America, such cultivation ceases at the 52nd degree.

Europe is, on the whole, more healthy than any other part of the earth.

POPULATION, GOVERNMENT, ETC.

Population 233,000,000, being about 61 inhabitants to each square mile.

This is about a quarter of the entire population of the globe, though Europe occupies but an eleventh of its surface.

Those countries are in general most populous which have the greatest extent of sea-coast. Thus Great Britain and Holland are the most densely peopled of the European states.

Most of the present inhabitants of Europe are descended from the three great tribes which emigrated from the East, at a period beyond record.—The Celts, occupying the west of Europe at the period when history opens, and represented by their descendants the modern Highlanders;—the Goths, occupying the central districts, from whom the Saxons and modern English take their descent; and the Sclavonians, the forefathers of the Russians, and the tenants of the soil at present possessed by those people.

Europe enjoys more liberty and possesses more knowledge than the other parts of the earth, hence civilization prevails, and arts and commerce flourish. Its influence is felt throughout the world; its laws are obeyed, its languages are spoken, and its colonies flourish in the most distant parts of the earth.

The five great powers which regulate the policy of Europe, are Russia, England, France, Austria, and Prussia.

The whole of Europe professes Christianity under one form or another, excepting Turkey, where Mahometanism prevails. Protestantism prevails in the north; the Greek church predominates in the east; and the Roman Catholic religion in the south.

About a million and a half of Jews are scattered throughout Europe; they are most numerous in Poland.

QUESTIONS FOR EXAMINATION.

In what part of the eastern hemisphere is Europe situated? What are its boundaries, and with which of the other general divisions is it connected? Which is the most southern point of Europe? Which is the most northern? Which the most westerly? Between what parallels of latitude is Europe situated? How many degrees of longitude does it contain? What is its length and breadth?

How many independent states are there in Europe?

Which are the five great powers?

How is Europe distinguished from every other continent?

Which is the largest inland sea in the world?

What is the eastern part of the Mediterranean called?

What great nations have flourished on the shores of the Mediterranean?

What is the ancient name of the Dardanelles?

What small sea branches out from the Frozen Ocean?

What three gulfs communicate with the Baltic? What bay lies between France and Spain? What gulf separates Italy from Turkey?

What small gulfs are in the Baltic? What gulfs communicate with the Mediterranean? What channel forms the communication between the German Ocean and the Baltic? What strait connects the German Ocean with the English Channel? Through what strait does the Atlantic constantly flow into the Mediterranean?

What strait lies between the Sea of Marmora and the Archipelago?

What strait lies between the Sea of Marmora and the Black Sea?

What are the principal lakes in Europe? Which is the highest mountain in Europe? What is the height of Mount Blanc? What range forms the boundary between France and Spain? Through what country, and in what direction, do the Apennines run? What mountains bound Hungary on the north and east? What mountain range traverses Norway?

Which is the highest volcanic mountain in Europe? Which the lowest? When did Vesuvius first become an active volcano?

Name the six principal rivers of Europe in the order of their importance. Where does each rise? Into what seas do they fall? What circumstances modify the climate of Europe? What are its principal islands? Name the principal capes. What is the population of Europe? Which, in proportion to their area, are the most populous countries? How are the three great divisions of the Christian religion geographically distributed?

BRITISH ISLANDS.

GREAT BRITAIN.

Great Britain is the name now given to the United Kingdoms of England and Scotland.

It is called *Great,* to distinguish it from Brittany.

Great Britain extends from 50 to 58½ degrees north latitude, and from 2 degrees east to 6 degrees west longitude. Its length may be computed at 580, and its breadth at 360 British miles.

Great Britain was the largest island known to the ancients; it was first discovered by the Phœnicians, who visited it for its tin. The Romans invaded it under Cæsar, B.C. 55; and they continued in possession of it till A.D. 409, when they completely abandoned it.

ENGLAND.

England is bounded on the east by the German Ocean; on the south by the English Channel; on the west by the

Irish Sea and St. George's Channel; and on the north by Scotland.

The Sark, an artificial line called the Scots Dikes, the River Liddell, the Cheviot Hills, and the Tweed, form the boundary line between England and Scotland.

Under the Romans a wall extending from the Tyne to the Solway, built first by Agricola, again by Hadrian, and afterwards by Severus, separated the two countries.

The superficial extent of England and Wales is 57,960 square miles.

DIVISION INTO COUNTIES.

Under the Romans England was divided into four parts:

1st, Maxima Cæsariensis; south of the wall as far as the Humber and Mersey. 2nd, Flavia Cæsariensis, to the south of the former, as far as the Bristol Channel, but exclusive of;—3rd, Britannia Secunda, which comprehended Wales, and all west of the Severn. 4th, Britannia Prima, embracing all the southern coast.

By the Saxons England was partitioned at first into eight, but shortly afterwards into seven kingdoms—hence called the Heptarchy. These were,

1st, The kingdom of Northumbria, comprehending the whole of the six northern counties. 2nd, Mercia, corresponding to the Roman division Flavia Cæsariensis, with the exception of the two following kingdoms. 3rd, East Anglia, containing Norfolk, Suffolk, and Cambridgeshire. 4th, East Saxony, comprehending Essex, Middlesex, and the eastern part of Herts. 5th, Kent, answering to the county of that name. 6th, South Saxony—Surrey and Sussex. 7th, Wessex, comprehending the four southern and three south-western counties.

The Heptarchy became one kingdom under Egbert, and was afterwards divided by Alfred into 32 shires, which number was subsequently increased to 40, making, at present, together with the twelve into which Wales is divided, 52.

Six Northern.

COUNTY.	CHIEF TOWN.	RIVER.
Northumberland	Newcastle	Tyne
Cumberland	Carlisle	Eden
Durham	Durham	Wear

COUNTY.	CHIEF TOWN.	RIVER.
Yorkshire	York	Ouse
Westmoreland	Appleby	Eden
Lancashire	Lancaster	Lune

Four bordering on Wales.

Cheshire	Chester	Dee
Shropshire	Shrewsbury	Severn
Herefordshire	Hereford	Wye
Monmouthshire	Monmouth	Wye

Twelve Midland.

Nottinghamshire	Nottingham	Trent
Derbyshire	Derby	Derwent
Staffordshire	Stafford	Sow
Leicestershire	Leicester	Soar
Rutlandshire	Okeham	
Northamptonshire	Northampton	Nen
Warwickshire	Warwick	Avon
Worcestershire	Worcester	Severn
Gloucestershire	Gloucester	Severn
Oxfordshire	Oxford	Thames
Buckinghamshire	Aylesbury	Tame
Bedfordshire	Bedford	South Ouse

Eight Eastern.

Lincolnshire	Lincoln	Witham
Huntingdonshire	Huntingdon	South Ouse
Cambridgeshire	Cambridge	Cam
Norfolk	Norwich	Yare
Suffolk	Ipswich	Orwell
Essex	Chelmsford	Chelmer
Hertfordshire	Hertford	Lea
Middlesex	London	Thames

Three South-Eastern.

Surrey	Guildford	Wey

COUNTY.	CHIEF TOWN.	RIVER.
Kent	Canterbury	Stour
Sussex	Chichester, *or* Lewes	
	Four Southern.	
Berkshire	Reading	Thames
Wiltshire	Salisbury	Avon
Hampshire	Winchester	Itchyn
Dorsetshire	Dorchester	Frome
	Three South-Western.	
Somersetshire	Wells, *or* Taunton	
Devonshire	Exeter	Exe
Cornwall	Launceston	Tamar
	Six North Wales.	
Flintshire	Flint	Dee
Denbighshire	Denbigh	Clwyd
Caernarvonshire	Caernarvon	
Anglesey	Beaumaris	
Merionethshire	Harlech, *or* Bala	
Montgomeryshire	Montgomery	Severn
	Six South Wales.	
Radnorshire	Radnor, *or* Presteign	
Cardiganshire	Cardigan	Tivy
Pembrokeshire	Pembroke	Milford Haven
Caermarthenshire	Caermarthen	Towy
Brecknockshire	Brecon	Usk
Glamorganshire	Caerdiff	Taafe

Three of these counties, Chester, Durham, and Lancaster, are called counties *Palatine*, because the owners of them (the Earl of Chester, the Bishop of Durham, and the Duke of Lancaster) had in those counties royal powers as fully as the king has in his palace (*in palatio*).

London is a county by itself, distinct from Middlesex, and is *governed by its own* sheriffs and other magistrates. Chester, Bristol, Coventry, Canterbury, Exeter, Gloucester, Litchfield, Lincoln, Norwich, Worcester, York, Hull, Nottingham, Newcastle-upon-Tyne, Pool, Southampton, are also counties *corporate*, as they are termed.

England is divided into six circuits; they are as follow:—

Home Circuit.—Hertford, Essex, Surrey, Sussex, and Kent.

Midland Circuit.—Northampton, Rutland, Lincoln, Nottingham, Derby, Leicester, and Warwick.

Norfolk Circuit.—Bucks, Bedford, Huntingdon, Cambridge, Suffolk, and Norfolk.

Oxford Circuit.—Worcester, Stafford, Shropshire, Hereford, Monmouth, Gloucester, Oxford, and Berks.

Western Circuit.—Hampshire, Wilts, Dorset, Devon, Cornwall, and Somerset.

Northern Circuit.—York, Durham, Northumberland, Cumberland, Westmoreland, and Lancaster.

Wales is divided into two circuits, the *South Wales* and the *North Wales Circuit*, which include Chester.

COAST.

England, excepting at its junction with Scotland, is surrounded by the sea; this, besides the protection which it affords from invading foes, is essential to our existence as a commercial nation. Its form is nearly triangular.

The figure of England approaches pretty nearly to the fanciful representation given of the island by the Romans, as a woman seated on a rock, the well-known Britannia.

The principal head-lands are Flamborough Head and Spurn Head in Yorkshire; Yarmouth, situated on the most easterly point of the island; North Foreland in Kent; Beachy Head in Sussex; Portland Bill in Dorset; Start Point in Devon; Lizard Point, the most southerly, and Land's-end, the most westerly point of England; with the remarkable projections formed by the counties of Pembroke and Caernavon.

The principal inlets on the East, are the Humber, the Wash, and the Estuary of the Thames. On the West, the Bristol Channel, Cardigan Bay, Morecambe Bay in Lancashire, and the Solway Firth.

The *navigation of the* coast is on all sides endangered by sands and shoals, the most famous of which are the Yarmouth Sands and the Goodwin Sands: the latter stretch parallel to the coast from North to South Foreland, forming the Downs, a much frequented road for ships.

ISLANDS.

The principal islands are the Isle of Wight, the Island of Anglesea, and the Isle of Man.

Holy Island or Lindisfarne, where literature found an asylum in the dark ages, and which contains the ruins of an ancient abbey and castle is off the coast of Northumberland. The Isle of Wight, a large and beautiful island, called the Garden of England, is off the coast of Hampshire. Eddystone Rock, on which the famous light-house is erected, is nearly opposite Plymouth. The Scilly Islands, 17 in number, are off Land's End. Anglesea was the last resort of the Druids, it is of itself a county. The sovereignty of the Isle of Man was possessed by the Dukes of Athol, until it was purchased in 1765 by the British Parliament. The Channel Islands, off the N. E. coast of France, have belonged to England since the 11th century. The chief of them are Jersey, Guernsey, and Alderney. Heligoland (Holy Island), opposite the mouth of the Elbe, also belongs to Britain; it is a useful possession in time of war; it was anciently the seat of worship of the Saxon goddess Phoseta.

MOUNTAINS.

England is generally a level country. A range of hills passing from Scotland extends with some interruptions through the whole length of the country, keeping chiefly to the western side. In Cheviot this chain attains an elevation of 2680 feet. Sca Fell, in Cumberland, is 3166 feet high, and Skiddaw 3022.

In Derbyshire it forms a mountainous district, denominated the Peak; between Hereford and Worcester, it forms the Malvern Hills; in Somersetshire, the Mendip Hills; and in Devonshire, the extensive and rugged district of Dartmoor. The highest hills in the southern division of the island are those of Wales, Snowdon in Caernarvon being 3571 feet high.

LAKES.

The principal lakes lie in the mountainous districts of

Cumberland, Westmoreland, and Lancashire—the largest of these are, Windermere, which is 12 miles long, Ulles Water, Conniston Water, Derwent Water, and Bassenthwaite.

RIVERS.

RIVERS THAT FALL INTO THE NORTH SEA.

The Tweed divides Northumberland from Scotland for a considerable space, and then falls into the sea at Berwick.

The Tyne is formed of a southern branch, which rises near Alston in Cumberland; and of a northern one, from the borders of Scotland. Those branches unite above Hexham, and become a large river, which, flowing on to Newcastle, and forming a fine harbour between North and South Shields, empties itself into the sea at Tynemouth.

The Wear rises on the edge of Cumberland, and running by Wolsingham, Bishop-Auckland, Durham, and Chester-le-Street, enters the sea at Sunderland.

The Tees rises very near the source of the Wear, and running by Barnardcastle, Yarm, and Stockton, forms the boundary between Durham and Yorkshire, from its source to the sea.

The Esk is a small river, which joins the sea at Whitby.

The Humber is a large estuary formed by the united streams of the Derwent, the Ouse, the Aire, the Don, and the Trent. All of these are Yorkshire rivers, except the Trent, which drains several of the midland counties.

The separate courses of these rivers are as follows:—

The Swale, from Richmond, and the Ure, navigable from Ripon, unite near Boroughbridge, and form the Northern Ouse, which flows by York and Selby.

The Derwent rises near Scarborough, is navigable to Malton, and joins the Ouse below Selby.

The Wharfe runs by Otley, Harewood, Wetherby, and Tadcaster, whence it is navigable, and joins the Ouse at Cawood.

The Aire, from Leeds, and the Calder, from Wakefield, unite at Castleford, run by Ferrybridge, and join the Ouse at Howden.

The Don, from Sheffield and Rotherham, runs by Doncaster, and joins the Ouse in an artificial channel called the Dutch River.

The other branch of the Humber is the Trent. It rises near Newcastle in Staffordshire: and, receiving the Sow from Stafford, the Tame from Tamworth, the Dove from Ashbourn, the Derwent from Derby, and the Soar from Leicester, joins the Ouse at Adlingfleet, where both are lost in the Humber. The direct course of this river is 100 miles. It is navigable from Burton, and runs by Nottingham, Newark, and Gainsborough.

The Witham runs by Grantham and Lincoln, and falls into the Wash at Boston, the only seaport town in Lincolnshire.

The Welland forms the north-west boundary of Northamptonshire, and runs by Stamford, (whence it is navigable,) Market-Deeping, and Spalding. Barges can get up to Spalding only at spring tides.

The Nen is navigable from Northampton, whence it runs by Peterborough and Wisbeach into the Wash.

The Southern Ouse rises in Northamptonshire, runs by Towcester, Buckingham, Bedford, Huntingdon, St. Ives, Ely, and at Lynn-Regis falls into the Wash. The Cam from Cambridge, the Lark from Bury, and the Little Ouse from Thetford, fall into this river.

The Yare, in Norfolk, becomes navigable at Norwich, and being joined by the Waveney, falls into the sea at Yarmouth.

The Orwell and the Stour, uniting at their junction with the sea, form the harbour on which Harwich stands.

The Coln runs by Colchester; the Blackwater, in the north-western corner of Essex, near Maldon, is joined by the Chelmer, and then forms a large estuary called Blackwater Bay, famous for its oysters.

The Thames rises near Cirencester in Gloucestershire, and receiving the Cherwell at Oxford, the Tame at Dorchester, the Kennet at Reading, the Coln and the Brent in Middlesex, the Wey and the Mole in Surrey, and the Lea from Hertford and Ware, joins the sea near Gravesend. It passes by Oxford, Abingdon, Wallingford, Reading, Windsor, London, Woolwich, and Gravesend.

The course of the Thames is computed at 140 miles, and it is navigable to Cricklade. It serves as a boundary line during the greater part of its course, and separates the counties of Oxford, Buckingham, Middlesex, and Essex, on the north, from Berkshire, Surrey, and Kent, on the south. The breadth of this river at London is about 440 yards, crowded with ships, which convey into that capital the wealth of the globe. This city enjoys the advantages of a seaport, with the security of an inland town.

The Medway rises in Sussex, is navigable from Tunbridge, and running by Maidstone, Rochester, and Chatham, falls into the mouth of the Thames at Sheerness.

The Stour runs by Canterbury and Sandwich, and falls into the sea at Ramsgate, remarkable as a bathing place.

RIVERS THAT FALL INTO THE ENGLISH CHANNEL.

The Rother runs by Rye, the Ouse by Lewes, and the Arun by Arundel.

A bay, running up between the island of Portsea and the opposite peninsula, forms the capacious harbour of Portsmouth, the grand naval arsenal of England. The harbour is narrow at its entrance, but spreads out into an inland bay, five or six miles in length, and from two to four in breadth.

The Itchin runs by Winchester, and falls into the bay of Southampton.

The Avon is navigable from Salisbury, and, meeting the Stour from Stourminster, falls into the sea at Christchurch, an inconsiderable port.

The Exe runs by Exeter, and falls into the sea below Topsham.

The Tamar separates Cornwall from Devonshire, and runs into Plymouth Sound.

RIVERS THAT FALL INTO THE BRISTOL CHANNEL.

The Torridge by Bideford, and the Taw by Barnstaple, run into Barnstaple Bay.

The Avon, navigable from Bath, falls, below Bristol, into the Bristol Channel.

The Severn rises from the mountain Plinlimmon, pursues an easterly course to Shrewsbury, turns south to Gloucester, and, after a progress of 150 miles, forms that large arm of the sea called the Bristol Channel. It runs by Welch Pool, (whence it is navigable,) Shrewsbury, Bridgenorth, Bewdley, Worcester, Tewksbury, and Gloucester.

The Severn is remarkable for its high tide, which often rolls impetuously in with a height of three or four feet, accompanied by a great noise. This is occasioned by the contraction of the channel, which becomes too narrow for the flow of the waters from the Atlantic, which are opposed by the strong current of the river.

The Avon, from Warwick and Stratford, joins the Severn at Tewksbury.

The Wye has its source near that of the Severn, runs by Hereford, Ross, and Monmouth, and falls into the Bristol Channel at Chepstow.

RIVERS THAT FALL INTO THE IRISH SEA.

The Towey runs by Caermarthen, and the Tivy by Cardigan.

Milford Haven, in Pembrokeshire, is a remarkable inlet.

The Dee rises in Wales, and runs, by Chester, into the Irish Sea.

The Mersey rises in Yorkshire, divides Lancashire from Cheshire, is navigable to Stockport, and runs, by Warrington and Liverpool, into the Irish Sea. It receives the Irwell, a navigable river, from Manchester.

The Ribble runs through the middle of Lancashire, by Preston, into the Irish Sea.

The Lune or Lon, rises in Westmoreland, and falls, below Lancaster, into the Irish Sea.

The Eden rises also in Westmoreland, and runs, by Appleby and Carlisle, into the Solway Firth.

CANALS.

The earliest inland navigation that can be authenticated is the Sankey canal, leading from the coal-pits at St. Helen's, in Lancashire, to the river Mersey, in order to convey coals to Liverpool; the length of the canal is 12 miles.

The Duke of Bridgewater is regarded as the grand founder of inland navigation. His first canal extends from Worsley Mill to Manchester, by a course of nine miles. There are subterraneous passages to the coal, in the mountains, of nearly a mile in length, sometimes cut through the solid rock. This beautiful canal is brought over the river Irwell, by an arch of 30 feet in height, under which barges pass without lowering their masts.

We shall review the other canals in geographical order, proceeding from north to south.

The Lancaster canal extends from Kendal in Westmoreland, by Lancaster, to West-Houghton in Lancashire, a space of 74 miles.

The canal from Leeds to Liverpool, by Skipton, winds through an extent of 117 miles; and from this canal a branch extends to Manchester.

From Halifax to Manchester is another canal, commonly called that of Rochdale; length 31½ miles.

Another canal extends from Manchester towards Wakefield; and another, called the Peak Forest Canal, stretches from the former south-east, about 15 miles.

Another joins the river Don, several miles above Doncaster, to the *river Calder*, near Wakefield.

The Chesterfield canal extends from Chesterfield to the river Trent at Stockwith, a course of 55 miles.

In Lincolnshire, one canal extends from Lincoln to the Trent, and another from Horncastle to Sleaford.—Grantham canal reaches from that town to the Trent, a course of 30 miles.

Liverpool is connected with Hull by a canal from that long navigable river the Trent. This canal is styled the Grand Trunk: its length is 99 miles. It was attended with great difficulties, particularly in passing the river Dove in Derbyshire, where there is an aqueduct of 23 arches: the tunnel through the hill of Hare Castle in Staffordshire is in length 2880 yards, more than 70 yards below the surface of the ground, and was executed with great labour and expense.

Several branches extend in various directions from the Grand Trunk: one reaches to the river Severn, near Bewdley, and connects the port of Bristol with those of Liverpool and Hull; the length is 46 miles.

A canal proceeding by Shrewsbury, unites the Mersey and the Severn.

From Coventry, in the centre of the kingdom, canals extend to the Grand Trunk, to Ashby-de-la-Zouch, and to the Braunston, or Grand Junction, canal.

Several inland navigations pass by Birmingham. The Union canal completes a course of 44 miles from Leicester to Northampton, whence the Nen is navigable to the sea. Another canal extends from Gloucester to Hereford.

The Severn is united with the Thames by a canal from Stroud to Lechlade, a course of 40 miles.

The Oxford canal extends to the Grand Trunk, or rather joins the Coventry Canal, after a course of 92 miles.

The Grand Junction canal reaches from Brentford on the Thames, and joins the Oxford canal at Braunston in Northamptonshire, after a course of 90 miles.

On the south of the Thames, a canal extends from Reading to Bath.

Besides these, there are several smaller canals.

RAILWAYS.

Railways were first introduced in the north of England, where they are much used in the conveyance of coals from the collieries to the places of shipment. Originally the rails were of wood.

The Stockton and Darlington railway was the first that was used for the conveyance of passengers, though its principal object is to carry the coals of the South Durham coal-field to the port of Stockton. The Act for its construction was obtained in 1821.

The Liverpool and Manchester Railway was opened in 1830. The experiments tried upon it first developed the extraordinary powers of the locomotive engine.

The London and Birmingham railway is 112 miles long: it was opened in 1838. It has a branch to Aylesbury, another to Northampton and Peterborough, and a third to Warwick and Leamington.

The Grand Junction Railway continues the line northwards from Birmingham to a point in the Liverpool and Manchester Railway midway between these two towns. It has a branch from Crew direct to Manchester, and another from the same point to Chester, which will shortly be continued to Holyhead.

The North Union, the Preston and Lancaster, and the Lancaster and Carlisle Railways, give an uninterrupted line of communication between these places and the metropolis.

The Newcastle and Carlisle, and the Carlisle and Maryport Railways, admit of the easy transfer of goods between the opposite coasts of the island.

The Newcastle and Darlington Junction, and the Great North of England, connect Newcastle with York. The York and North Midland, and the North Midland Railway, traverse the important coal and manufacturing district between York and Leeds, and Derby. The Hull and Selby Railway, the Manchester and Leeds Railway, the Manchester and Sheffield Railway, connect the towns indicated by their names. A line proceeds direct from Derby to Birmingham. The Midland Counties Railway, commencing at Derby, brings forward the northern traffic to Rugby, where it joins the London and Birmingham.

The Eastern Counties Railway, intended to reach from *London to* Norwich, is executed as far as Colchester. A branch extends from Norwich to Yarmouth. The Cambridge Railway gives easy access to the University from London.

The London and Brighton line is remarkable, in an engineering point of view, the shortest line having been adopted, almost irrespective of the rugged nature of the country.

The South Eastern Railway, striking off from the Brighton line at Red Hill, traverses the centre of Kent, and connects London with Folkestone and Dover. It thus forms the great highway to the continent.

The South Western connects London with Southampton; a branch to Portsea facilitates intercourse with Portsmouth.

The Great Western Railway, passing Slough, (in the neighbourhood of Windsor,) Maidenhead, and Reading, proceeds to Bath and Bristol. It is thence continued to Exeter, and will shortly be completed to Plymouth. A branch from Oxford joins the Great Western.

The Bristol and Gloucester Railway, and the Birmingham and Gloucester, give a direct communication between the south-western extremity of the kingdom and the midland and northern districts.

Several other important lines are in contemplation. The usual width or gauge of the rails is 4 feet 8½ inches. The gauge of the Great Western and dependent railways is 7 feet.

The cost of railways in England has varied from £14,000 to £40,000 per mile.

The ordinary speed of passenger trains is 25 miles per hour, including stoppages; but the express trains on some of the great lines approach the rate of 40 miles per hour.

CLIMATE.

Owing to its insular situation, the climate of England is variable and moist, better adapted for the growth than for the ripening of the productions of the earth. Extreme cold is not felt in winter, and the summers are seldom oppressive.

The month of January is the coldest of the year, when the mean temperature is 36 degrees Fahrenheit; July and August are the hottest months, when the mean temperature is 61 degrees.

The usual extremes of heat and cold are 80 and 20 degrees. The west and south-west winds are the most prevalent in England, and as they come saturated with the moisture of the Atlantic, the western coast of the island is most subject to rain. The greatest quantity of rain falls near Kendal; the least in Norfolk.

VEGETABLE PRODUCTIONS.

The oak is the most valuable and characteristic of the British forest trees, but is much less abundant than formerly. Wheat is raised in large quantities in all parts. Norfolk and Suffolk are famous for barley, Kent and Worcestershire for hops. The most extensive dairy-farms are in Cheshire and Gloucestershire and the intervening counties. The total annual value of the agricultural produce of England and Wales is upwards of 130 millions. This amount is annually upon the increase, owing to the great attention now paid to the subject.

ANIMALS.

The bear, the wolf, and the wild boar, once common in the English forests, have long since been extirpated. The golden eagle is sometimes, although rarely seen. The nightingale, the finest of British songsters, rarely wanders so far north as Yorkshire, and is not met with in the western counties.

MINERALS.

England is rich in mineral treasures. The tin mines of Cornwall have always been famous; the copper mines of this district and of Anglesea, are more than sufficient to supply the extensive wants of this country. Lead, with which silver is intermingled, is abundant in the neighbourhood of Alston Moor in Cumberland, and in Derbyshire. Zinc is got in the same districts. The plumbago, or black lead of Cumberland, exceeds in quality that of any other country. England smelts more iron than all the world besides. The ore is providentially most plentiful in those districts where coal and lime, which are necessary for its reduction, abound.

Coal is a very abundant mineral. The most important district is the northern coal-field, which nearly covers the counties of Northumberland and Durham; it gives direct employment to upwards of 45,000 persons.

Another coal-field lies between Leeds and Nottingham, in the centre of which Sheffield is placed. Coal is wrought at Ashby-de-la-Zouch in Leicestershire. The South Stafford beds, one of which is 30 feet thick, supply the manufactories of Birmingham with a great abundance of coal at a cheap rate, their inland situation forbidding its export. The coal districts of the west are Whitehaven, the extensive tract lying between Manchester, Blackburn, and Liverpool, the mines of Flintshire in North Wales, and the South Wales coal-field, which spreads over an extent of not less than 1000 square miles.

TOWNS IN ENGLAND AND WALES.

⁂ The figures (1.), (2.), show the number of Members respectively returned. Those printed in Italic are Bishopricks.

Abergavenny, Monmouth, an ancient town on the Usk and Gavenny.

Aberystwith, Cardigan, a sea-port.

Abingdon, Berks, r. Thames; trades in corn and malt. (1.)

Alban's, St., Herts, r. Coln; the ancient Verulam; it is said to take its present name from the first British martyr to the Christian faith; battle between Henry VI. and Earl of Warwick, 1455. The fine abbey church contains the remains of Lord Bacon. (2.)

Alfreton, Derby; manufactory of brown earthenware.

Alnwick, Northumb., r. Alne; a magnificent castle, the seat of the Duke of Northumberland.

Alston, Cumb., r. Tyne; lead mines.

Ambleside, Westmorl., Windermere lake; woollen cloth.

Andover, Hants, r. Ande. (2.)

Appleby, Westmorl., r. Eden; the assize town.

Arundel, Sussex, a sea-port, on the r. Arun; Arundel Castle, formerly a strong fortress, now the magnificent seat of the Dukes of Norfolk, is contiguous. (1.)

Asaph, St., Flint, near r. Clwyd; the vale of Clwyd is remarkable for its beauty.

Ashburn, Derby, r. Dove; considerable trade in cheese.

Ashburton, Devon, r. Dart. (1.)

Ashby-de-la-Zouch, Leicester.

Ashton-under-Line, Lanc.; a considerable manufacturing town. Pop. 46,304. (1.)

Austle, St., Cornwall; tin mines and porcelain clay. Pop. 10,320.

Aylesbury, Bucks, r. Thame; a fertile vale. (2.)

Băla, Merioneth, r. Dee; assizes held alternately at Băla and Dolgelly.

Banbury, Oxford, r. Cherwell; noted for cakes and ale; good market for corn, cattle, and provisions. (1.)

Bangor, Caernarvon, on the Strait of Menai; the construction of the magnificent chain bridge across the Strait of Menai has rendered Bangor a great thoroughfare; it is much resorted to in summer by visitors.

Barking, Essex, r. Rhoding, near its junction with the Thames.

Barnardcastle, Durham, r. Tees.

Barnsley, York; manufactories of hardware, glass, &c. Pop. 12,310.

Barnstaple, Devon, r. Taw; woollen trade. (2.)

Bath, Somerset, r. Avon; this fine city owes its name and origin to its hot springs. Pop. 38,304. (2.)

Battle, Sussex; it obtained its name from the battle of Hastings; the best gunpowder made here.

Beaumaris, Anglesey, a sea-port on the Strait of Menai. (1.)

Beccles, Suffolk, r. Waveney.

Bedford, Bedford, r. South Ouse; John Bunyan composed the Pilgrim's Progress in its gaol. (2.)

Belper, Derby; cotton manufactories.

Berkeley, Gloucest.; its ancient castle in good repair; Edward II. murdered here.

Berwick, Northumb., r. Tweed; before the union a place of great importance, and the theatre of many fierce conflicts; it exports corn and salmon. (2.)

Beverley, York, near the Hull; chiefly remarkable for its very beautiful minster. (2.)

Bewdley, Worcester, r. Severn; it trades in malt, leather, and iron ware. (1.)

Bideford, Devon, r. Torridge; a good harbour in the Bristol Channel.

Biggleswade, Bedford, r. Ivel; a good market for corn and cattle.

Bilston, Stafford; various manufactories of hardware; iron ore abundant. Pop. 20,180.

Birmingham, Warwick; one of the greatest manufacturing towns in England, especially in fire-arms, hardware and cutlery: it communicates by canals and railroads with all parts of the kingdom. Pop. 190,493. (2.)

Blackburn, Lanc., r. Ribble; manufactories of cotton, calicoes, and muslin; Stonyhurst, the principal educational establishment of the Roman Catholics in England, is in the vicinity. Pop. of the parish, 71,711. (2.)

Bodmin, Cornwall, r. Camel; manufacture of serges. (2.)

Bolton, Lanc.; increasing manufactories of cottons, calicoes, muslins, &c. Pop. 73,905. (2.)

Boston, Lincoln, r. Witham; a sea-port possessing considerable trade. Pop. 12,942. (2.)

Bradford, Wilts, r. Lower Avon; fine broad-cloths and kerseymeres. Pop. 10,571.

Bradford, York, r. Aire; iron foundries, extensive manufactories of worsted yarns and stuffs, shalloons, &c. Pop. 34,560. (2.)

Brecon, Brecknock, r. Usk. (1.)

Bridgenorth, Salop, r. Severn; considerable trade in cloth, stockings, and iron manufactures. (2.)

Bridgewater, Somerset, r. Parret; Admiral Blake born here in 1599. Pop. 10,449. (2.)

Bridlington, (pronounced Burlington,) Bridlington Bay, York; a safe bay on the German Ocean, south of Flamborough Head.

Bridport, Dorset; a sea-port on the English Channel. (2.)

Brighton, (formerly Brighthelmstone,) Sussex; a fashionable resort for sea-bathing, on the English Channel. Pop. 46,616. (2.)

Bristol, Gloucester and Somerset, r. Avon; extensive trade with the East and West Indies and America. Clifton, a suburb of Bristol, is famous for its romantic scenery and hot wells. Pop. 140,158. (2.)

Buckingham, r. South Ouse; paper and lace. (2.)

Burnley, Lanc.; the neighbourhood abounds with coal; cotton manufactures. Pop. 10,699.

Burslem, Stafford; extensive potteries. Pop. 16,091.

Burton, Stafford, r. Trent; an ancient town noted for the excellence of its ale.

Bury, Lanc., r. Irwell; cotton manufactures. Pop. of the parish, 20,710. (1.)

Bury St. Edmunds, Suffolk, r. Larke; an important corn market: its monastery, in which was preserved the body of the Saxon king Edmund, was the richest and most powerful in England, with the exception of Glastonbury. Pop. 12,538. (2.)

Caermarthen, r. Towey; the river is navigable up to the town for vessels of 300 tons burden. (1.)

Caernarvon, Strait of Menai; in its castle, which now forms a magnificent ruin, the first prince of Wales, afterwards Edward II., was born. (1.)

Calne, Wilts, r. Marlow; cloth manufactures. (1.)

Cambridge, r. Cam; celebrated for its University, which dates from the thirteenth century. Pop. 24,453. (2.)

Canterbury, Kent, r. Stour; the archiepiscopal see of the primate of all England. Thomas à Becket murdered here before the altar, A.D. 1170: Edward the Black Prince died here in 1376; his tomb is in the cathedral. Pop. 15,435. (2.)

Cardiff, Glamorgan, r. Taaf; in the castle of Cardiff Robert, Duke of Normandy, was imprisoned by his younger brothers. Pop. 10,077. (1.)

Cardigan, r. Tivy; considerable coasting trade. (1.)

Carlisle, Cumb., r. Eden; manufactures consist of cotton, linen, hats, &c. Pop. 23,012. (2.)

Cartmell, Lanc.; seated on a promontory which runs into the Irish Sea.

Castleton, Derby; famous for its caverns and lead mines.

Chard, Somerset; manufacture of lace.

Chatham, Kent, r. Medway; one of the principal stations and arsenals of the royal navy: barracks for marines, and regimental depôts: the fortifications are extensive and of great strength. Pop. 21,341. (1.)

Chelmsford, Essex, r. Chelmer; the county town.

Cheltenham, Gloucester, r. Chelt; much frequented for its mineral springs. Pop. 31,411. (1.)

Chepstow, Monmouth, r. Wye; advantageously situated for commerce; it has become the port of all the towns on the Wye and the Lugg: the tide has been known here to rise to the extraordinary height of 70 feet.

Chertsey, Surrey, r. Thames. This is supposed to be the place where Cæsar led his army across the Thames into the kingdom of Cassivelaunus.

Chester, Cheshire, r. Dee; an ancient city, has many interesting Roman remains; formerly of great trade, which has been mostly transferred to Liverpool;

Matthew Henry, the Commentator, minister of a congregation here. Pop. 23,115. (2.)

Chesterfield, Derby, r. Rother; noted for cotton and silk manufactories, also for its collieries, potteries, and iron works. Pop. 11,231.

Chichester, Sussex; large market for sheep and black cattle; Collins, the poet, was born here. (2.)

Chippenham, Wilts, r. Avon; superfine cloths. (2.)

Christchurch, Hants, r. Avon and Stour; considerable trade in knit silk stockings and watch chains. (1.)

Cirencester (*pro.* Sissester), Gloucester; a place of considerable importance during the Roman domination: manufactories of edge tools, and also of carpets. (2.)

Clitheroe, Lanc., r. Ribble; cottons. (1.)

Cockermouth, Cumb., r. Cocker and Derwent; hats, coarse woollens, and linens manufactured here. (2.)

Colchester, Essex, r. Colne; famous for oysters: manufacture of baize, serge and silk stuffs. Pop. 17,790. (2.)

Collumpton, Devon, r. Culm; woollens and corduroys.

Colne, Lanc.; manufactures of cotton and worsted.

Congleton, Cheshire, r. Dean; leather and cotton.

Coventry, Warwick, r. Avon; chiefly supported by its manufactures of ribands and watches: the steeple of St. Michael's Church is deemed one of the finest in Europe, it is 203 feet high. Pop. 30,743. (2.)

Cranbrooke, Kent; the woollen manufacture introduced in Edw. III.'s reign has disappeared; trade in hops.

Crediton, Devon, r. Exe.

Cricklade, Wilts, r. Thames. (2.)

Croydon, Surrey; paper, printing cottons, &c.; near it is Addiscombe, one of the colleges of the East India Company. Pop. 16,712.

Darlington, Durham, r. Skerne; spinning mills, and manufactures of table and napkin linen; coal trade. Pop. 11,877.

Dartford, Kent, r. Darent; noted for powder mills.

Dartmouth, Devon, r. Dart; Torbay, to the north of this town, is the principal rendezvous of the British navy; Newcomen, the inventor of the atmospheric steam engine, born here. (1.)

David's, St., Pembroke.

Deal, Kent, on the Strait of Dover; it is supposed to have been the place where Julius Cæsar first landed.

Denbigh, r. Clwyd; situated at the foot of a craggy hill, in the middle of the fertile vale of Clwyd. (1.)

Deptford, Kent, r. Thames; a royal dock-yard, with all kinds of stores for the navy: Peter the Great worked as a shipwright here. Pop. 23,165.

Derby, r. Derwent; extensive silk mills and porcelain manufactures. Pop. 32,741. (2.)

Dereham, East, Norfolk: Cowper the poet is buried here.

Devizes, Wilts, on the Kennet and Avon canal; woollen manufactories, principally fine cloths. (2.)

Devonport, Devon; a large sea-port adjoining Plymouth: royal dockyard. Pop. 43,532. (2.)

Diss, Norfolk, r. Waveney; manufactures of hempen cloth, hose, and stays.

Dolgelly, Merioneth., r. Avon, near the foot of the mountain Cader Idris.

Doncaster, York, r. Don; its situation is remarkably pleasant: celebrated for its races. Pop. 11,245.

Dorchester, Dorset, r. Frome; noted for the excellence of its ale: manufactures of broad cloth. (2.)

Dorking, Surrey; noted for its breed of fowls; the custom of *Borough English,* by which the youngest son succeeds to copyhold property, prevails in this manor; near this town the river Mole sinks under ground, and rises again at about three miles distance.

Dover, Kent, Strait of Dover; thoroughfare to and from France: lofty, chalk cliffs, and strongly fortified castle: a cinque port. Pop. 13,872. (2.)

Droitwich, Worcester, on a canal; the salt springs here are the strongest in England, from which the finest salt is made. (1.)

Dudley, Worcester; extensive iron works: the stratification of the limestone rocks of the vicinity is remarkable; *trilobites* and other fossils interesting to geologists abound. Pop. 17,077. (1.)

Dunstable, Bedford; straw hats.

Durham, r. Wear; the cathedral is a fine gothic building: battle at Nevill's Cross, where David II. was taken prisoner, 1347: university. Pop. 14,151. (2.)

Dursley, Gloucester; some trade in broad cloth, and manufacture of cards for wool-combers.

Eccleshall, Stafford, r. Sow.

Ellesmere, Salop; the principal trade is in malt.

Ely, Cambridge, r. South Ouse; it is situated in a marshy district, called the Isle of Ely, which was the scene of the exploits of the brave Saxon, Hereward: the cathedral is one of the finest in England.

Enfield, Middlesex.

Eton, Bucks, r. Thames; celebrated for its public school, founded by Henry VI.

Evesham, (*pro.* Easham,) Worcester, r. Avon; situated in a beautiful vale: battle fought in 1265 between Prince Edward and the confederated barons, headed by Simon de Montfort. (2.)

Exeter, Devon, r. Exe; the market for woollen cloths is the greatest in England, except Leeds. Pop. 31,312. (2.)

Exmouth, Devon, r. Exe; a favourite watering place.

Eye, Suffolk; inhabitants chiefly employed in agriculture. (1.)

Falmouth, Cornwall, r. Fale; admirable harbour: station of mail packets to South America.

Farnham, Surrey, r. Wey; noted for hop plantations: a great wheat market.

Faversham, Kent; gunpowder: oyster fishery.

Flint, r. Dee. (1.)

Folkstone, Kent; a sea-port on the English Channel: the birth-place of Dr. Harvey, who discovered the circulation of the blood.

Frodsham, Cheshire, r. Wever; salt works and cotton manufactories.

Frome, Somerset, r. Avon and Frome; manufactures of broad cloth and kerseymere. Pop. 11,849. (1.)

Gainsborough, Lincoln, r. Trent; considerable trade in corn and Baltic produce.

Gateshead, Durham, r. Tyne; extensive iron works, glass manufactories, potteries, &c. Pop. 19,505. (1.)

Gloucester, r. Severn; chief manufactures are those of hemp and cordage, wool stapling, and pin making. George Whitfield born here. Sunday schools first established here by Robert Raikes. Pop. 14,152. (2.)

Gosport, Hants, situated on Portsmouth Harbour; a naval arsenal, extensive barracks and docks. Pop. 13,510.

Grantham, Lincoln, r. Witham; here Sir Isaac Newton received the rudiments of literature. (2.)

Gravesend, Kent, r. Thames; considered the termination of the port of London, the great rendezvous of outward-bound ships. Tilbury Fort is on the opposite side of the river.

Greenwich, Kent, r. Thames; famous for its hospital and royal observatory. Queen Elizabeth born here. Pop. 29,595. (2.)

Grimsby, Great, Lincoln; a sea-port near the mouth of the Humber. (1.)

Guildford, Surrey, r. Wey; corn, malt, and beer. (2.)

Hadleigh, Suffolk, r. Breton; some trade in spinning yarn for the Norwich weavers.

Halifax, York, r. Calder; extensive woollen manufactures. Pop. 19,881. (2.)

Halstead, Essex, r. Colne; baize, silk, velvet, &c.

Hartlepool, Durham, on the North Sea; an improving town and sea-port. Coal trade.

Harwich, Essex, r. Stour and Orwell; large and safe harbour: station of packets to Holland and Germany. (2.)

Haslingden, Lanc.; extensive linen, cotton, and woollen manufactures. Pop. 10,568.

Hastings, Sussex; one of the Cinque ports, though now a bad harbour: battle between William the Conqueror and Harold, 1066. Pop. 11,607. (2.)

Haverfordwest, Pembroke; chief trading town in the county. (1.)

Helstone, Cornwall; a sea-port, and one of the stannary towns, being one of those appointed for the stamping of tin. (1.)

Hemel Hempstead, Hertford, r. Gade; a great market for corn.

Henley, Oxford, r. Thames; considerable trade in supplying London with corn, flour, malt, and beech wood, sent down the Thames.

Hereford, r. Wye; noted for cider, the county being called the orchard of England. Pop. 10,921. (2.)

Hertford, r. Lea; King John of France and David II. of Scotland confined in its ancient castle: near this town is the college of Hailybury, belonging to the East India Company. (2.)

Hexham, Northumberland, r. Tyne; noted for manufactories of leather and gloves: battle between Queen Margaret and House of York, 1463.

Hinckley, Leicester; wove and knit stockings.

Hitchin, Hertford.

Holbeach, Lincoln.

Holywell, Flint, r. Dee; lead, calamine, and copper mines: from St. Winifred's Well, which gives name to the place, water flows in such abundance as to turn nearly all the mill machinery of the town. Pop. 10,834.

Holyhead, Anglesea; station of packets to Dublin, from which it is distant 63 miles: the completion of the railway from Chester to Holyhead will bring the capitals of the two islands within a few hours' distance of each other.

Honiton, Devon; manufacture of broad lace. (2.)

Horsham, Sussex, r. Adur; Horsa, the brother of Hengist, is said to have built this town, hence its name: the spring assizes are held here. (1.)

Howden, York, r. Ouse; remains of a palace, formerly the summer residence of the bishops of Durham.

Huddersfield, York; this town is the seat of extensive woollen manufactures, chiefly narrow cloths. Pop. 25,068. (1.)

Hull, York, r. Hull; extensive and increasing commerce, both foreign and domestic: chief seat of the northern whale fishery. In the civil wars Hull was the first town to close its gates against the king. Pop. 41,629. (2.)

Huntingdon, r. South Ouse; the county takes its name from its having been formerly well adapted for the chase: Oliver Cromwell born here. (2.)

Hythe, Kent, Strait of Dover; a Cinque port. (1.)

Ilchester, Somerset, r. Ivel; birth-place of Roger Bacon.

Ilfracombe, Devon; a convenient harbour on the Bristol Channel.

Ilminster, Somerset, r. Ille; narrow cloths.

Ipswich, Suffolk, r. Orwell; Cardinal Wolsey born here. Pop. 24,940. (2.)

Ives, St., Cornwall; a sea-port. (1.)

Keighley, York; manufactures of woollen cloths and Manchester goods. Pop. 13,413.

Kendal, Westmoreland, r. Ken; cotton and woollen manufactories. Pop. 10,225. (1.)

Keswick, Cumberland, beautifully situated on Derwentwater.

Kettering, Northampton; some manufactures of lace and woollen cloths.

Kidderminster, Worcester, r. Stour; carpet manufactures extensive: inland trade by canals. Pop. 14,399. (1.)

Kirby Lonsdale, Westmoreland, r. Lune.

Kirby Stephen, Westmoreland, r. Eden; much cattle is sent from this neighbourhood to Liverpool.

Knaresborough, York, r. Nid; manufactory of linen cloth: noted for its petrifying well. (2.)

Knutsford, Cheshire, r. Birken; its name is contracted from Canutesford.

Lancaster, r. Lune; some trade to the West Indies, America, and the Baltic, and inland trade by means of canals. Pop. 24,707. (2.)

Landaff, Glamorgan, r. Taaf; this place, though a bishop's see, is now a mean village.

Launceston, Cornwall, r. Tamar; a stannary town. (1.)

Leamington, Warwick; a fashionable watering place.

Ledbury, Hereford, r. Leden; manufactures of ropes and sacking.

Leeds, York, r. Aire; possesses many advantages for commerce, by a long line of canals and navigable rivers: it is the principal market of the woollen cloths manufactured in the West Riding. Pop. 152,054. (2.)

Leek, Stafford, r. Churnet; ribands, silk twist, and buttons. Pop. 11,738.

Leicester, r. Soar; Wolsey died here. Pop. 48,167. (2.)

Leighton Buzzard, Bedford, r. Ouse.

Leominster, Hereford, r. Lugg; gloves and hats. (2.)

Lewes, Sussex, r. Ouse. (2.)

Litchfield, Stafford; birthplace of Dr. Johnson. (2.)

Lincoln, r. Witham; the cathedral here is a magnificent structure, inferior in size and grandeur only to that of York. Pop. 16,172. (2.)

Liskeard, Cornwall; tin mines. (1.)

Liverpool, Lanc., r. Mersey; it is supposed to engross one-fourth of the foreign trade of Great Britain, one-sixth of her general trade, three-fourths of the trade with the United States, to furnish one-twelfth of the shipping of the kingdom, and in exports and imports to equal half the trade of London. Steam packets to America. Pop. 286,487. (2.)

Llanelly, Caermarthen, r. Burry. Pop. 11,155.

London, Middlesex, r. Thames; its extent from east to west, is full seven miles and a half, and its breadth, from north to south, is nearly five miles, occupying altogether an area of thirty square miles, or nearly 20,000 acres. London is the grand centre of the commerce of the world; here the crown usually resides; here the legislature of the nation and the courts of law have their seat. It is the great mart of literature in this land. It possesses a University of recent origin, with which two colleges, University College and King's College, are connected. St. Paul's Cathedral, Westminster Abbey and Hall, and the Tower, are buildings of peculiar interest; to these may be added the Exchange and the New Houses of Parliament. The Thames Tunnel, completed in 1843, has attracted the attention of the civilized world. Pop. 1,873,676. The Metropolitan Boroughs send 18 members to parliament.

Loughborough, Leicester, r. Soar. Pop. 10,170.

Louth, Lincoln, r. Lud; some coasting trade.

Lowestoff, Suffolk, on the North Sea; the most eastern promontory in Great Britain.

Ludlow, Salop, r. Teme and Corve. (2.)

Luton, Bedford, r. Lea; straw hats.

Lutterworth, Leicester; the scene of the pastoral labours of John Wycliffe, who died here A. D. 1384.

Lyme Regis, Dorset; an artificial harbour in the English Channel. (1.)

Lymington, Hants; chief commerce is the import of coals and the export of salt. (2.)

Lynn Regis, Norfolk, r. Ouse; a considerable sea-port. Pop. 16,039. (2.)

Macclesfield, Cheshire, r. Bollin; extensive silk and cotton manufactures. Pop. 24,137. (2.)

Maidstone, Kent, r. Medway; the centre of the hop trade: large orchards of apples and cherries. Pop. 18,086. (2.)

Maldon, Essex, r. Blackwater. (2.)

Malmesbury, Wilts, r. Avon; woollen cloth. (1.)

Malton, York, r. Derwent. (2.)

Manchester, Lanc., r. Irwell; the chief emporium of the cotton trade, and the most considerable manufacturing town in the kingdom. Pop., with Salford, 353,390. (2.)

Mansfield, Nottingham, r. Idle; cotton mills; it also trades in corn and malt.

Margate, Kent; a fashionable resort for bathing. Pop. 11,050.

Market Bosworth, Leicester; the battle of Bosworth Field, in which Richard III. fell, in 1485.

Marlborough, Wilts, r. Kennett. On Marlborough Downs are the vast Druidical circles of Avebury, and the immense barrow called Silbury Hill. (2.)

Marlow, Great, Bucks, r. Thames; black silk, lace and paper. (2.)

Maryport, Cumberland; timber trade with America, coal trade with Ireland and Scotland.

Melcombe Regis, Dorset, r. Wey. (2.)

Merthyr Tydvil, Glamorgan; from an obscure village this town has been raised, by its extensive iron works, to be the largest town in Wales. Pop. 34,977. (1.)

Midhurst, Sussex, r. Arun. (1.)

Milford, Pembroke; a modern town, on Milford-haven: this harbour may contain in security a thousand ships.

Minchinhampton, Gloucester; extensive manufactures of woollen cloth.

Monmouth, r. Wye; manufactures of iron: birth-place of Henry V. (1.)

Montgomery, r. Severn. (1.)

Morpeth, Northumb., r. Wansbeck. (1.)

Nantwitch, Cheshire, r. Weaver; extensive salt mines.

Neath, Glamorgan, r. Neath; copper and iron works.

Newark, Notts, r. Trent; King John died here: its castle, or *New-work*, rebuilt by Stephen, is an interesting ruin. Pop. 10,195. (2.)

Newbury, Berks, r. Kennet; woollen manufactures: battles in the civil wars in 1643 and 1644.

Newcastle, Northumb., r. Tyne; this town is the centre of the coal trade; it possesses extensive manufactories in iron, glass, pottery ware, and chemical works: in the number of ships, and also in the amount of tonnage, this port ranks next to London; Akenside born here. Pop. including suburbs, 90,000. (2.)

Newcastle, Stafford, r. Trent; potteries. (2.)

Newmarket, Camb. and Suffolk; celebrated for its horse-racing, first made fashionable by James I.

Newport, Hants; chief town on the Isle of Wight. (2.)

Newport-Pagnel, Bucks, r. Ouse; paper and lace.

Northallerton, York, r. Swale; battle of the Standard fought here, 1139. (1.)

Northampton, r. Nen; boots, shoes, and stockings for the London market, and also for exportation: near this town is Naseby, where Cromwell defeated Charles I. Pop. 21,242. (2.)

Northwich, Cheshire, r. Weaver; cotton manufactures and salt works.

Norwich, Norfolk, r. Yare; manufactures of woollen stuffs, camlets, crape, and shawls. Pop. 62,344. (2.)

Nottingham, r. Trent; the centre of the bobbin, net, and lace manufacture, and stockings. Pop. 53,091. (2.)

Oakham, Rutland.

Oldham, Lanc.; various manufactures of Manchester goods. Pop. 32,381. (2.)

Olney, Bucks, r. Ouse; Cowper long resided here.

Ormskirk, Lanc. Pop. of the parish, 14,608.

Oswestry, Salop; manufacture of flannel.

Otley, York, r. Wharfe.

Oxford, r. Thames; celebrated for its University, one of the oldest and the most richly endowed in Europe. Pop. 23,834. (2.)

Pembroke, situated on Milford-haven. (1.)

Penrith, Cumb., r. Eamont.

Penryn, Cornwall, situated on a creek. (2.)

Penzance, Cornwall; one of the stannary towns; the most westerly town in England, and much resorted to by invalids for the mildness of its climate.

Peterborough, Northampton, r. Nen; Dr. Paley born here. A few miles from Peterborough are the ruins of Fotheringay Castle, in which Richard III. was born, and Mary Queen of Scots was beheaded. (2.)

Petersfield, Hants. (1.)

Plymouth, Devon, r. Plym; the second naval station in the kingdom, it is capable of holding 1,000 sail of ships. The breakwater is a stupendous work, giving great security to vessels anchoring in the Sound. Pop., including Devonport, 80,059. (2.)

Pontefract or Pomfret, York, r. Aire; Richard II. was murdered here. (2.)

Poole, Dorset; it sends out several ships every year to Newfoundland; they carry out provisions, &c., and return laden with fish for Spain, Portugal, and Italy. (2.)

Portsmouth, Hants; the head-quarters of the British royal navy; the town and dockyard are very strongly fortified; the harbour is unequalled in Britain; its entrance is narrow, but within it increases in width so as to render it capable of holding nearly the whole British navy. The celebrated road of Spithead lies between Hampshire and the Isle of Wight. Pop., including Portsea, 53,058. (2.)

Prescot, Lanc.; noted for the manufacture of watches. Pop. of the whole parish, 35,902.

Presteign, Radnor, r. Lugg.

Preston, Lanc., r. Ribble; cotton manufactures. Pop. 53,482. (2.)

Radnor, r. Summergill; the county town. (Other towns unite with it in returning a member to parliament, as is the case with most of the towns in Wales.) (1.)

Ramsgate, Kent; a fashionable bathing-place, situated on the Strait of Dover. Pop. 10,909.

Reading, Berks, r. Kennet and Thames; great quantities of corn, flour, and timber are conveyed to London by barges. Alfred defeated by the Danes in 871, Henry I. buried, and Archbishop Laud born here; ruins of castle and abbey. Pop. 18,937. (2.)

Retford, East, Notts, r. Idle. (2.)

Richmond, York, r. Swale. Its name betokens the beauty of its situation; its castle, a fine Norman structure, marks its ancient grandeur and importance. (2.)

Richmond, Surrey, r. Thames, formerly called Sheen; it was for centuries the site of a royal palace; a favourite resort of visitors from London.

Rickmansworth, Herts, r. Gade.

Ringwood, Hants, r. Avon; narrow cloths and stockings.

Ripon, York, r. Ure; spacious market-place and beautiful minster. Pop. 15,024. (2.)

Rochdale, Lanc., r. Roche; woollen, cotton, and hat manufactories; noted for its flannel. Pop. 84,718. (1.)

Rochester, Kent, r. Medway; a fine cathedral, and ruins of a noble Norman castle. Pop. 11,743. (2.)

Ross, Hereford, r. Wye; the native town of John Kyrle, *the Man of Ross*, celebrated by Pope.

Rotherham, York, r. Don; iron and steel manufactories. Pop. 13,439.

Runcorn, Cheshire. Pop. 13,207.

Rye, Sussex, r. Rother; one of the three towns added to the Cinque Ports. (1.)

Ryegate, Surrey, near the r. Mole; the neighbourhood abounds with fuller's earth. (1.)

Saffron Walden, Essex; it derives its name from the great quantities of saffron formerly grown here.

Salford, Lanc., r. Irwell; adjoining Manchester. (1.)

Salisbury, Wilts, r. Avon; manufacture of flannels: the cathedral is a fine building, with a spire 410 feet high, the loftiest in Britain. Old Sarum, in its vicinity, was an important and strong city in the Saxon and Norman periods of our history, but is now an utter ruin. In Salisbury plain are the remarkable remains, called Stonehenge, (*i. e.* hanging stones). Pop. 10,086. (2.)

Sandwich, Kent, r. Stour; one of the Cinque ports, but the harbour is now nearly choked up: the vicinity is noted for the production of garden seeds. (2.)

Scarborough, York, a sea-port on the German ocean, of considerable trade; much resorted to by the inhabitants of the large manufacturing towns of Yorkshire for sea-bathing. Pop. 10,060. (2.)

Seven Oaks, Kent, r. Darent; here are an alms-house and grammar-school, founded by Sir W. Rumsted, who had been a deserted child, and having been found in Seven Oaks, afterwards became Lord Mayor of London.

Selby, York, r. Ouse; considerable trade.

Shaftesbury, Dorset; manufacture of shirt-buttons. (1.)

Sheffield, York, r. Don; famous for its manufactories of cutlery and plated goods. Pop. 111,091. (2.)

Shepton Mallet, Somerset; woollen manufactures.

Sherborne, Dorset, r. Ivel; woollens and silks.

Shields, North, Northumb., r. Tyne; coal trade. Pop. (including Tynemouth) 27,249.

Shields, South, Durham, r. Tyne; the Venerable Bede resided at Jarrow, in its vicinity; life-boat invented here. Pop. of S. Shields and Westoe, 26,672. (1.)

Shoreham, Sussex, a sea-port on the English Channel. (2.)

bury, Salop, r. Severn; flannels, linen manufac-
s, and extensive iron works; battle between Henry
nd Hotspur, 1402; fine ruins of an old castle and
erable abbey. Pop. 21,517. (2.)
, York, r. Aire.
npton, Hants, r. Itchen; considerable foreign and
ing trade; station of the West Indian and Medi-
nean mail steam-packets; Dr. Watts was born
in 1674. Pop. 27,744. (2.)
ark, Surrey, r. Thames; a large and eminent
rb of London. Pop. 98,648. (2.)
g, Lincoln, r. Welland; some trade in corn, coals, &c.
l, r. Sow; trade in shoes. Pop. 10,370. (2.)
d, Lincoln, r. Welland; Burghley House, in its
ity, the seat of the Marquis of Exeter, is one of
inest Elizabethan residences in the country. (2.)
ort, Cheshire, r. Mersey; cotton manufactories.
84,282. (2.)
Stafford, r. Trent; the centre of the district termed
otteries. Pop. 46,342. (2.)
n, Durham, r. Tees; harbour much improved,
trade increased by rail-roads into the adjoining
icts: large export of coal. Pop. 10,071.
Stafford, r. Trent; earthenware.
idge, Worcester, r. Stour; iron manufactories,
and earthenware.
rd-upon-Avon, Warwick, r. Avon; birth-place of
speare in 1564.
Gloucester, r. Frome and Slade; this town is
idered the centre of the cloth manufactory: the
r is peculiarly adapted to the dyeing of scarlet and
other colours. (2.)
y, Suffolk, r. Stour. Lately disfranchised.
land, Durham, r. Wear; coal trade; ship-build-
glass, and earthenware: an iron bridge of 236

feet span, and 100 feet above the level of the river. Pop., including the Wearmouths, 51,125. (2.)

Swansea, Glamorgan, on the Bristol Channel; potteries, iron foundries, and furnaces for smelting copper ore: a thriving sea-port. Pop. 16,787. (1.)

Tadcaster, York, r. Wharf; the neighbourhood abounds in limestone.

Tamworth, Stafford, r. Tame; narrow cloths. (2.)

Tavistock, Devon, r. Tavy. (2.)

Taunton, Somerset, r. Tone; manufactory of silks. Pop. 12,066. (2.)

Teignmouth, Devon, r. Teign; exports pipe-clay.

Tetbury, Gloucester; manufactory of woollen cloth.

Tewksbury, Gloster, r. Severn; here was fought the last battle between the houses of York and Lancaster. (2.)

Thetford, Norfolk, r. Ouse; paper manufactories. (2.)

Thirsk, York, r. Codbeck; coarse linens. (1.)

Tideswell, Derby; its name is derived from its ebbing and flowing well, one of the wonders of Derbyshire.

Tiverton, Devon, r. Exe; serges, kerseys, diapers, &c. Pop. 10,040. (2.)

Topsham, Devon, r. Exe; port of Exeter.

Totness, Devon, r. Dart; fishing town. (2.)

Towcester, Northampton, r. South Ouse; lace and silk.

Trowbridge, Wilts, r. Were; broad cloth. Pop. 11,050.

Truro, Cornwall; one of the stannary towns: it exports copper and tin. (2.)

Tunbridge, Kent, r. Medway; noted for its wells. Pop. 12,530.

Tynemouth, Northumb., r. Tyne; a fashionable bathing place: most of the population of this borough is in North Shields. (1.)

Ulverstone, Lanc., r. Leven; it exports iron ore, limestone, and corn.

Uttoxeter, Stafford, r. Dove; ironmongery.

Uxbridge, Middlesex, r. Colne; chief trade is in supplying London with flour.

Wakefield, York, r. Calder; woollen cloths and stuffs: battle 1460. Pop. 29,992. (1.)

Wallingford, Berks, r. Thames. (1.)

Walsall, Stafford; sadlery, hardware. Pop. 20,852. (1.)

Wantage, Berks, r. Ock; birthplace of Alfred.

Ware, Herts, r. Lea; it chiefly supplies London with malt.

Wareham, Dorset, r. Frome; exports pipe-clay. (2.)

Warminster, Wilts, r. Wily; manufactures of fine cloth.

Warrington, Lanc., r. Mersey; manufactures of coarse cloth, fustians, and pins. Pop. 21,901. (1.)

Warwick, r. Avon; its castle is one of the finest ancient feudal mansions in the kingdom. (2.)

Watford, Herts, r. Colne; silk manufactory.

Wednesbury, Staff.; iron manufactures. Pop. 11,625.

Wells, Somerset, at the S. foot of Mendip Hills; the cathedral is a spacious and beautiful Gothic structure. (2.)

Welshpool, Montgomery, r. Severn; flannels.

Wenlock, Much, Salop. (2.)

Westbury, Wilts; broad cloth. (1.)

Westminster, Middlesex, r. Thames; forming a part of London, though with a distinct jurisdiction. Pop. 222,053. (2.)

Weymouth, Dorset, r. Wey; a fashionable resort for bathing. (2.)

Whitby, York, r. Esk; a considerable coasting trade: Capt. Cook born here, 1728. Pop. 11,682. (1.)

Whitchurch, Salop; malt and hop trade.

Whitehaven, Cumb.; a sea-port on the Irish Sea: coal and West India trade. Pop. 11,854. (1.)

Wigan, Lanc.; celebrated for its brass and cotton manufactures. Pop. 51,988. (2.)

Wigton, Cumb.; cotton manufactures.

Wilton, Wilts, r. Wily and Nadder; carpets. (1.)

Wimborne Minster, Dorset, r. Stour.

Winchester, Hants, r. Itchen; a place of great importance in Roman and Saxon times; Alfred and William Rufus buried here: a spacious cathedral and celebrated public school. Pop. 10,732. (2.)

Windsor, Berks, r. Thames; magnificent royal palace, a favourite residence of the kings of England. (2.)

Wirksworth, Derby; lead mines.

Wisbeach, Cambridge, r. Nen; considerable trade in the export of corn.

Witney, Oxford, r. Windrush; manufacture of blankets.

Wolverhampton, Stafford; celebrated for locks, keys, and similar articles. Pop. 70,370. (2.)

Woodstock, Oxford; manufacture of gloves; near it are Blenheim house and park. (1.)

Woodbridge, Suffolk, r. Deben; it trades to London, Hull, Newcastle, &c.

Woolwich, Kent, r. Thames; military and naval arsenal, and royal military academy. Pop. 25,785.

Worcester, r. Severn; the largest hop market in the kingdom; Cromwell defeated the royalists here, 1650; in its ancient cathedral is the tomb of King John: manufactures of gloves and china. Pop. 26,306. (2.)

Workington, Cumb., r. Derwent; salt works; salmon fishery; trade in coal and iron.

Worksop, Nottingham.

Wrexham, Denbigh; manufacture of flannels; the largest town in North Wales. Pop. of the parish, 12,921.

Wycombe-Chipping, or High Wycombe, Bucks. (2.)

Yarmouth, Norfolk, r. Yare; a considerable sea-port, possessing both coasting and foreign trade; the fishing on the coast is considerable, that for mackarel in May and June, and that for herring in October and November. Pop. 24,086. (2.)

Yeovil, Somerset, r. Yeo or Ivil; gloves.

York, r. Ouse; the see of an archbishop; its minster is *the largest in* England: the only town, excepting London, whose mayor takes the title of Lord: Constantine the Great here first assumed the empire of Rome: Marston Moor is to the west of this city, where Prince Rupert was defeated in 1644. Pop. 28,842. (2.)

ORIGIN OF ENGLISH NAMES.

The frequent occurrence of towns and rivers of the same name shows that, however unmeaning the terms may now be, they were once words of significative import. The derivation of many of them may yet be traced to the Celtic, the Saxon, and the Norman languages.

Thus *Aber*, signifies the mouth of a river, as Abergavenny.
Ac or *Ack*, an oak, as Acton.
Ald is the Saxon for old, thus Aldborough.
Burn, a running stream, as Otterburn.
Caster, *Chester*, &c. are from the Latin *castrum*, a camp.
Chipping, a market, as Chipping Norton, Chippenham, &c.
Ford, a passage over a river, as Oxford.
Ham, a dwelling, as Horsham.
Mar or *Mer*, is the sea, as Margate, an opening of the sea.
Minster, a monastery, as Westminster.
Ness signifies a headland, as Sheerness.
Nottingham is from the Saxon Snotengham, a place of caves.
Wich signifies a salt spring, as Droitwich.
Wick is from the Latin *vicus*, a street, as Berwick, *i. e.* the barrier town.

OF THE NAMES OF RIVERS.

Aire signifies a fishing weir; *Avon*, a river; *Dee*, black; *Esk* or *Usk*, water; *Derwent*, water from a hill; *Severn*, muddy; *Thame*, quiet; this river, on being joined by the Isis, takes both names, Thamesis, contracted into Thames.

POPULATION.

England and Wales has 16 millions of inhabitants—about 275 to the square mile; a density of population which exceeds that of any other country except China.

Human life is longer in Britain than elsewhere, owing to the comfort and cleanliness enjoyed throughout the country.

The English are descendants of the Anglo-Saxons intermingled with the Normans and other tribes. The Welsh are sprung from the ancient Britons.

LANGUAGE.

The English language is copious and strong, its vocabulary consists of upwards of 90,000 words. The body of it is Saxon, but it contains a large number of Latin, Greek, French, and other foreign words.

In the translation of the Lord's Prayer, only five words are not Saxon. This language, originally the dialect of a small tribe emigrating from the mouth of the Elbe, is the native tongue of millions in every quarter of the globe. In it Milton and Shakspeare wrote; in it Burke and Chatham, Fox and Pitt, gave utterance to the splendours of their eloquence; by it Bacon and Locke, Boyle and Newton, communicated their discoveries in morals and in physics—names, which, at the least, will live as long as any of those of Greece or Rome.

CHARACTER.

The English are characterised by their love of liberty, their bravery, their industry, and their active and enterprising spirit. The social affections are much cherished, and the sweets of domestic intercourse are largely enjoyed. They are less sprightly and gay than the French, but more thoughtful and sincere. The middling and lower classes enjoy a much larger share of real comfort and independence than usually falls to the lot of these ranks. The nation is in general well educated, though in some of the rural districts of the southern and midland counties a lamentable degree of ignorance prevails. The only universities are those of Oxford and Cambridge, together with the recently established institutions of London and Durham.

RELIGION.

The established religion is Protestant, the English people, under Henry VIII., being the first who renounced the Pope's supremacy. The Church of England is governed by two archbishops, and twenty-five bishops.

The archbishop of Canterbury is the primate of all England. The dissenters from the church are very numerous and enjoy complete toleration.

ANCIENT NAMES.

Albion and Britannia.

QUESTIONS FOR EXAMINATION.

Between what parallels is Great Britain situated? Describe the boundaries of England. What are the principal capes of England? Into how many counties is England divided? What counties lie to the north, and what are their chief towns? Name the midland counties, &c. Name the highest hills in England and Wales.

What river falls into the sea at Tynemouth? What river runs through the middle of the county of Durham, and where does it fall into the sea? What river divides Durham from Yorkshire? On what river is Whitby situated? What are the rivers in Yorkshire that flow into the Humber? On what rivers are York, Leeds, Sheffield, and Ripon situated?

What river runs from the south into the Humber? Describe the rise, course, and tributary streams of this river. On what river is Boston situated? What river runs by Wisbeach? Describe the course of the Southern Ouse. What rivers are there in Norfolk, Suffolk, and Essex? To how many counties does the river Thames serve as a boundary? What are the principal towns it runs by? On what river is Canterbury?

What are the rivers that run into the English Channel? What large river empties itself into the Bristol Channel? On what river is Chester situated? What river runs by Liverpool? On what river are Appleby and Carlisle? On what river is Lancaster?

What is the climate of England? Name the principal coal-fields of England. Where is tin, where is copper wrought? Point out the lead mining districts. Write out a list of the principal towns in each of the six northern counties. Do the same with each of the counties bordering on Wales, &c. What is the population of England? From whom are the English descended? What is the character of the English? What is the established religion?

N. B.—A useful way of examining a class upon the towns of England, is to write the names given in the preceding list upon counters, and to distribute them promiscuously to the pupils; those who cannot tell the situation of the places to yield the counters to those who can. The pupils may be directed to prepare a series of questions on separate pieces of card, upon the remarks appended to the towns, as, "Which is the head-quarters of the British navy?" "Which is the most westerly town in England?" "Where was Mary Queen of Scots beheaded?" These questions may be promiscuously distributed as before.

SCOTLAND.

The northern portion of Great Britain, called Scotland, is 280 miles in length, and 160 at its greatest breadth; it extends from 54½ to 59 degrees north latitude, and from 2° to 6° W. long.

The superficial contents are 29,871 square miles.

Scotland is divided into 33 counties, which, according to their situation, may be arranged in three divisions.

Six Northern.

COUNTIES.	CHIEF TOWNS.
Orkney and Shetland (Isles)	Kirkwall and Lerwick
Caithness	Wick
Sutherland	Dornoch
Ross	Dingwall and Tain
Cromarty	Cromarty
Inverness	Inverness

Fourteen Midland.

Argyle	Inverary
Bute	Rothesay
Nairn	Nairn
Moray *or* Elgin	Elgin
Banff	Banff
Aberdeen	Aberdeen
Mearns *or* Kincardine	Stonehaven and Bervie
Angus *or* Forfar	Forfar

COUNTIES.	CHIEF TOWNS.
	Perth
	Cupar
ss	Kinross
mannan	Clackmannan
ng	Stirling
arton	Dumbarton

Thirteen Southern.

Lothian *or* Linlithgow	Linlithgow
Lothian *or* Edinburgh	Edinburgh
Lothian *or* Haddington	Haddington and Dunbar
ick *or* Merse	Greenlaw and Dunse
ew	Renfrew
	Ayr
on *or* W. Galloway	Wigton
rk *or* Clydesdale	Glasgow and Lanark
les *or* Tweeddale	Peebles
rk	Selkirk
urgh	Jedburgh
ries	Dumfries
udbright, *or* E. Galloway	Kirkcudbright

THE COAST.

e coast of Scotland is very irregular, especially on
estern side, though the deep indentations of the sea
th sides approach so nearly to each other as almost
ver the country into three parts.

e principal headlands are Cape Wrath, in Suther-
Dunnet Head, in Caithness, the most northerly
in the country; Peterhead, in Aberdeen, the most
ly; St. Abb's Head, in Berwickshire; the Mull
lloway, the most southerly point of Scotland; and
ull of Cantire, which terminates the peninsula of
ame.

MOUNTAINS.

These are the Cheviot Hills between England an land, and the Grampian Hills south of Inverness, extend from Stonehaven to Ben Lomond, and fo southern boundary of the Highlands.

Ben Lomond is 3,240 feet high.

Ben Nevis, in Inverness-shire, is generally r the highest mountain in Great Britain; it is 4,3 above the sea, but it has been recently asce that Ben Macdhu, in Aberdeenshire, is twen higher. The Ochil Hills, in the south of Per rise to a considerable elevation. The Pentlan are to the south of the Firth of Forth; the Lea are in Lanarkshire.

LAKES AND FIRTHS.

Loch Ness and Loch Lochy are in Inverness Lomond, in Dumbartonshire, is twenty-three mil the largest lake in Britain; Loch Awe, of nearl dimensions, is in Argyleshire; Loch Katrine, rem for its scenery, is situated in that rugged district of shire named from the circumstance the Trosacks Tay is in the centre of Perthshire. The principal fi arms of the sea, are the Firth of Dornoch, Murray the Firth of Tay, and of the Forth on the east; tl way, the Firth of Clyde, Loch Fyne, Loch Lynnh Lēēn) and several more inlets on the west.

The Scottish term Loch and the Irish Lough are applied in nately to fresh water lakes and to land-locked or deep inlets of

RIVERS.

The Spey, in Inverness-shire, forms for a consi way the boundary between Murray and Banff, an into the sea at Speymouth.

The Deveron, dividing the county of Banff fro of Aberdeen, falls into the sea at Banff.

The Dee and the Don, crossing Aberdeenshire from west to east, fall into the sea at Aberdeen.

The South Esk passes by Brĕchin and Montrose.

The Tay is the largest of the Scotch rivers; it derives its waters from the southern side of the Grampians as they encircle Perthshire. Its principal branch is that which expands into a loch which takes the name of the river. It runs by Dunkeld and Perth, and spreading into a wide estuary falls into the sea below Dundee: for a considerable space it forms the boundary between Angus and Fife.

The Forth rises from the eastern declivity of Ben Lomond, and being joined near Stirling by the Teith and Allan, it pursues a tortuous course to Alloa, where it gradually widens into that large arm of the sea called the Firth of Forth.

The Tweed rises in Peebles, runs by Peebles, Melrose, Kelso, and Coldstream, and falls into the sea at Berwick.

The Annan, a small river, runs into the Solway Firth at the town of Annan.

The Nith runs by Dumfries into the Solway Firth.

Another Dee runs by Kirkcudbright into the Irish Sea.

The Clyde rises near the source of the Tweed, in the mountainous district at the south of Lanarkshire. Near Lanark it falls over several precipices, one of them 80 feet in height, and passing Glasgow and Dumbarton, it joins the Firth of Clyde at Greenock.

CANALS.

A canal connects the firths of Forth and Clyde. Its length is 35 miles, beginning at the mouth of the Carron and ending at Bowling Bay, on the Clyde, ten miles below Glasgow.

There are 39 locks and several aqueduct bridges in the course of this canal; the Kelvin aqueduct consists of four arches, and carries the canal over a valley of 65 feet deep and 420 long.

The Union Canal joins the Forth and Clyde Canal near Falkirk, and proceeds direct to Edinburgh. The Caledonian Canal, constructed at the expense of government, opens a communication between the Murray Firth and the western sea. It proceeds along a line of lakes from Inverness by Fort Augustus and Fort William. It is 20 feet deep, and 90 miles long, yet there are only 28 locks upon it.

A short canal between Loch Gilp and Loch Crinan greatly facilitates intercourse with the western Highlands.

RAILWAYS.

The principal railways in Scotland already in operation are the Edinburgh and Glasgow, the Glasgow and Greenock, and the Glasgow and Ayr railways. The North British railway between Edinburgh and Berwick is in progress, and will, when completed and continued to Newcastle, give an unbroken line of railway between London and Edinburgh.

ISLANDS.

Bute and Arran are two beautiful islands which adorn the Firth of Clyde.

West of the peninsula of Cantire begin the Hebrides, the principal of which are Islay, Jura, Mull, Tiree, Coll, Skye, Lewis, and Harris, North and South Uist, &c.

Staffa and Icolmkill or Iona, are two small but very celebrated islands belonging to this group, — Staffa remarkable for its basaltic columns; and Icolmkill venerable as the asylum of literature in the dark ages.

The Orkney Isles are separated from the continent by a strait called Pentland Firth. The inhabited isles are about 26 in number: the chief is Mainland, frequently called Pomona. Kirkwall and Stromness are the principal towns.

The Shetland Isles are to the north of the Orkneys: they are 46 in number, 26 of which are said to be inhabited. Mainland is the largest. The principal town is Lerwick.

CLIMATE.

The climate of Scotland is colder than that of England; an excess of moisture prevails in the Western Highlands and Islands.

MINERALS.

ıl is abundant in the south of Scotland, but is not north of the Tay, where peat is much used as fuel. .s got in large quantities, especially in Lanarkshire ltirlingshire. The lead mines of Lanarkshire and 'ries are rich, and mixed with silver. Roofing slate ıds, particularly in the Isle of Easdale, one of the :des. The granite of Aberdeen and other parts is used in England for paving and building.

TOWNS IN SCOTLAND.

ıe Towns which send Members to Parliament are marked with sterisk *; several towns combine to send one Member only.

rdeen, r. Dee; a university: woollen, linen and ton manufactures: enters largely into the salmon ıery: several new streets and public edifices, of white .nite, have a beautiful appearance. Pop. 64,778.

leen, Old, r. Don, a mile to the north of Aberdeen.

ıethy, Perthsh., near the Earn and Tay, the capital the ancient Pictish kingdom.

'ie, Lanark; a rising town: extensive iron works l collieries in its vicinity. Pop. 12,418.

, Clackman., r. Forth; coal trade, Baltic trade, ale.

rews, St., Fife, North Sea: St. Regulus, (or St. Rule,) o is said to have brought Christianity into Scot-d, landed here, A.D. 370; before the Reformation the macy of Scotland; several interesting ruins betoken ancient importance of the city; a university; ıshart the reformer burnt in 1545, at the instiga-n of Cardinal Beaton, who was himself assassinated following year; Archbishop Sharpe assassinated ır here in 1679; Inch Cape or Bell Rock light is ıutifully seen from St. Andrews.

Annan, Dumfries, r. Annan ; coasting trade.

Anstruther, Fife, Firth of Forth.

Arbroath, Angus, r. Brothwick; sail cloth: paving stones: remains of a splendid abbey.

Ardrossan, Ayr, Firth of Clyde.

Ayr, r. Doon and Ayr ; Burns born in the vicinity.

Banff, Banff, r. Deveron ; salmon fisheries.

Blair Athole, Perth, r. Tilt and Garry.

Boileau, or Beauly, Inverness, r. Beauly.

Bo'ness (Borrowstoness), Linlithgow, Firth of Forth; one of the oldest Scottish sea-ports : salt works.

Bothwell, Lanark, r. Clyde ; Covenanters defeated, 1675: most rain falls here, in all Scotland.

Brēchin, Angus, r. South Esk ; manufactures, brown linen and sail cloth : salmon fishery : exports grain.

Burntisland, Fife, Firth of Forth.

Campbeltown, Argyle ; herring fishery : whiskey : here the Scots are supposed to have first landed on emigrating from Ireland. Pop. 5,028.

Clackmannan, Clackman., r. Devon and Forth.

Coldstream, Berwick, r. Tweed ; here Edward I. forded the Tweed with his overpowering host, in 1296: a regiment of guards raised here by General Monk to facilitate the restoration of Charles II.

Crieff, Perth, r. Earne.

Cromarty, Firth of Cromarty ; the Firth is one of the finest bays in Britain : herring fishery.

Culross, (*pro.* Coo-ross,) Perth, Firth of Forth ; coal, iron, &c.

Cumnock, Ayr, Lugar Water ; wooden snuff-boxes.

Cupar, Fife, r. Eden ; coarse linens.

Cupar, Angus and Perth ; linen ; leather.

Dalkeith, Edinburgh, r. North and South Esk ; the greatest corn-market in Scotland : the palace of the Duke of Buccleugh, which has twice recently been the residence of royalty.

Dumbarton, Dumbarton, r. Leven and Clyde; its castle, situated on an elevated rock, has always been a place of great strength: glass manufactures.

Dumblane, Perth, r. Allan; resorted to for its mineral waters: the battle of Sheriffmuir in its vicinity, 1715: its ancient cathedral is pretty entire; Leighton, afterwards Archbishop of Glasgow, long held this see.

*Dumfries, Dumfries, r. Nith; sends 35,000 cattle annually to England: manufacture of hosiery and hats. John Cummin slain in 1305, by Robert Bruce, in the chapel of its Franciscan monastery. Pop. 11,409.

Dunbar, Haddington, North Sea: some trade in the export of corn: Cromwell defeated here, in 1650, the Scottish army under General Leslie.

Dunfermline, Fife, Firth of Forth; diaper and table linen extensively manufactured: long the principal residence of the Scottish kings: Robert Bruce buried here: Charles I. born here. Pop. 20,217.

*Dundee, Angus, Firth of Tay; centre of the linen manufacture. Pop. 62,873.

Dunkeld, Perth, r. Tay; noted for its scenery.

Dunse, Berwick, r. Whittadder; Duns Scotus born here.

*Edinburgh, Edinburgh, near the Forth: the beautiful metropolis of Scotland, celebrated for its university and courts of law: it is supposed to have derived its name of Edwinesburgh from Edwin, king of Northumbria, who rebuilt, or perhaps first built, a castle upon the site of the present interesting structure. Holyrood House was a favourite residence of the Stuarts; Rizzio was murdered in it. Pop. 138,132.

*Elgin, Elgin, r. Lossie; ruins of a cathedral.

*Falkirk, Stirling, r. Carron; a thriving town; its cattle markets, held thrice a year, are the greatest in Scotland: the Carron iron works, about two miles from the town, are very extensive, and were celebrated during the last war for the manufacture of cannon: the Scots, under Wallace, defeated by Edward I. in 1298; the Pretender repulsed in 1746. Pop. 8,209.

Falkland, Fife; weaving: the remains of a palace once the stronghold of the Macduffs, Earls of Fife, afterwards a hunting residence of the kings of Scotland.

Forfar, Angus, Loch of Forfar. Pop. 9,626.

Forres, Elgin, r. Findhorn; the scene of a great part of the tragedy of Macbeth.

Fort Augustus, Fort William, Fort George, Inverness; three forts built after the Revolution to overawe the Highlanders.

Fortrose, Ross, Moray Firth: shoe-making.

Fraserburgh, Aberdeen, North Sea; linen yarn: some trade to the Baltic.

Galashiels, Selkirk, r. Gala; the first town in Scotland for the manufacture of woollen goods.

*Glasgow, Lanark, r. Clyde; with respect to commerce, manufactures, and population, the first city in Scotland: cotton and silk goods are manufactured to a great extent: it trades largely with the East and West Indies and America: its university is celebrated: steam navigation first practised in Britain in 1812, upon the Clyde: its cathedral is the most perfect of the ancient religious edifices of Scotland. Pop. 274,533.

Grangemouth, Stirling, r. Carron; here the great canal joins the Forth.

Greenlaw, Berwick, r. Blackadder.

* Greenock, Renfrew, Firth of Clyde; considerable trade to America and the West Indies: great sugar refineries. Pop. 36,135.

* Haddington, Haddington, r. Tyne; John Knox, the Scottish Reformer, was born here.

Hamilton, Lanark, r. Avon and Clyde; cotton weaving: orchard grounds. Pop. 8,876.

Hawick, Roxburgh, r. Teviot; worsted goods.

Inverary, Argyle, Loch Fyne; herring fishery, about 20,000 barrels are annually caught in the loch.

Inverkeithing, Fife, Firth of Forth; a large bay.

* Inverness, Inverness, r. Ness, the reputed capital of the Highlands; salmon fishery: manufactories of linen, cotton, and woollen: near this is Culloden Moor, so fatal to the house of Stuart in 1746. Pop. 11,568.

Irvine, Ayr, r. Irvine; exports coals to Ireland: James Montgomery, the poet, born here.

Jedburgh, Roxburgh, r. Jed; ruins of a fine abbey: the neighbourhood is famous for orchards.

Kelso, Roxburgh, r. Teviot and Tweed; some manufactories of flannel and woollen cloth; ruins of an abbey.

Kilmarnock, Ayr, r. Irvine; Scotch carpets, caps, woollen cloths, shoes, &c. Pop. 19,398.

Kincardine, Perth, Firth of Forth.

Kinghorn, Fife, Firth of Forth: near here Alexander III. was killed by a fall from his horse in 1295.

Kinross, Kinross, Loch Leven: on an island of this beautiful lake, Mary Queen of Scots was confined.

Kintore, Aberdeen, r. Don.

* Kirkcaldy, Fife, Firth of Forth; trade similar to Dundee: whale fishery: Dr. Adam Smith born here.

Kirkcudbright, (*pro.* Kir-coo'bree,) r. Dee.

* Kirkwall, Orkneys; the cathedrals of this place and Glasgow the only ones that survived the Reformation: kelp, long the staple manufacture of the Orkneys, has much declined: the whale ships touch here for a supply of men: herring, cod and lobster fishery.

Lanark, Lanark, r. Clyde; cotton manufactories; falls of Clyde: the scene of the first military exploit of Sir W. Wallace, who, in 1298, killed Hazelrigg, the English sheriff, and drove his soldiers from the town.

Lauder, Berwick, r. Leader.

* Leith, Edinburgh, Firth of Forth; the port of Edinburgh: its harbour is naturally bad, but it has been

greatly improved by a pier, which is half a mile long; extensive wet docks. Pop. 28,188.

Lerwick, Shetland; cod fishery: vessels engaged in the whale and herring fishery touch here.

Linlithgow, Linlithgow, near the r. Avon; the ruins of a palace long a royal residence: the Regent Murray was shot here in 1750, by Hamilton of Bothwellhaugh.

Lochmaben, Dumfries, r. Annan.

Maybole, Ayr, r. Doon and Gervan.

Melrose, Roxburgh, r. Tweed; linen and woollen cloths: Melrose Abbey—much celebrated for its picturesque remains. Abbotsford, the residence of Sir W. Scott, is in its vicinity.

* Montrose, Angus, r. South Esk; linen yarn, sail cloth, &c.: the first place in Scotland where Greek was taught, (1534). Pop. 14,252.

Musselburgh, Edinburgh, r. Esk and Firth of Forth; fishing and tanning leather: garden seeds: fishing nets made upon the loom.

Nairn, Nairn, r. Nairn.

Oban, Argyle, Bay of Oban; a new and rising town: place of rendezvous for the West Highland steamboats.

* Paisley, Renfrew, r. White-Cart; one of the principal manufacturing towns in Scotland—chiefly silk and cotton fancy goods and shawls. Pop. 48,426.

Peebles, Peebles, r. Tweed; woollen manufactories.

* Perth, r. Tay; cotton manufactures. It was the capital of Scotland prior to the death of James I.; the Scottish kings were crowned at Scone, (*pro.* Scoon,) two miles north of this city; the famous stone, reckoned the palladium of Scotland, was transferred from Dunstaffnage in the ninth century, to Scone, whence it was taken in 1296 by Edward I. to Westminster Abbey. Pop. 20,167.

Peterhead, Aberdeen, North Sea; the most eastern part of Scotland: herring fishery. Pop. 5,759.

Port Glasgow, Renfrew, r. Clyde; thread, woollen, and cotton cloth manufactories. Pop. 6,973.

Preston-pans, Haddington, Firth of Forth; near this place a battle was fought with the rebel army in 1745, in which Col. Gardiner was killed.

Portobello, Edinb., Firth of Forth; earthenware, glass.

Queensferry, Linlithgow, Firth of Forth; the Forth contracts here into a channel two miles wide, which makes it a place of great thoroughfare.

Renfrew, Renfrew, r. Cart.

Rothesay, Bute Island, celebrated for the salubrity of its climate.

Rutherglen, Lanark, r. Clyde; the fairs of this town are famous for the show of Lanark horses, esteemed the best draught horses in Scotland.

Saltcoats, Ayr, Firth of Clyde; coal and salt: frequented for sea-bathing.

Sanquhar, Dumfries, r. Nith; woollen trade.

Selkirk, r. Ettrick; Mungo Park born in the parish.

* Stirling, Stirling, Firth of Forth; carpets and shalloons: an ancient castle on a rocky eminence, the favourite residence of the later Scottish kings; the battle of Bannockburn fought in its vicinity in 1314.

Stonehaven, (*pro.* -hive,) Kincardine, North Sea.

Stranraer, (*pro.* -rawer,) Wigton, Loch Ryan; weaving.

* Tain, Ross, Firth of Dornoch.

Whithorn, Wigton, Bay of Wigton; the shrine of St. Ninian in the cathedral, was a place of great resort before the Reformation.

* Wick, Caithness, r. Wick; fisheries.

* Wigton, Wigton, Wigton Bay.

POPULATION.—2,620,184, being about 81 inhabitants to the square mile.

MANNERS AND CUSTOMS.

The manners of the Scotch closely resemble those of the *English. The Scotch* are a moral, sedate, shrewd, calculating people—though attached to home, they are to be met with in great numbers in every quarter of the globe. The Highlanders are a hardy and generous race, somewhat fiery, and devoted to the chiefs of their clans. The English language is universal among the Lowlanders, who are chiefly of Saxon extraction; the Gaelic is spoken in the north.

RELIGION.

The established religion of Scotland is the Presbyterian, which recognises no diversity of rank among its clergy. Education has been much attended to in Scotland, and the facilities for acquiring it are great.

GOVERNMENT.

For many centuries Scotland and England were incessantly at war; the wise policy of Henry VII. in giving his daughter Margaret in marriage to James IV. king of Scotland, led to the Union of the two kingdoms. On the death of Elizabeth, James VI. of Scotland became possessed of the English crown, which he assumed under the title of James I. The union of the two kingdoms was rendered complete in 1707, by the incorporation of their legislatures. Scotland sends 53 members to the British House of Commons, and 16 peers to the House of Lords, who are elected every parliament to represent the nobility.

ANCIENT NAME,

Caledonia; the name Scotia seems to have been given to it about the twelfth century, by a number of Irish who had emigrated to it.

QUESTIONS FOR EXAMINATION.

What are the length and breadth of Scotland? What are the counties in the northern division, with their chief towns? Name those in the midland division. What counties are in the southern division, and *what are their chief towns? Which is the most northerly point of Scotland?* Which the most easterly? Which the most southerly?

Which is the capital of Scotland, and what is its port? Which of the Scottish counties are washed by the British Ocean or North Sea? What county is the nearest to Ireland? Between which two counties does the Firth of Clyde lie? What is the name of that Firth which lies between Fifeshire and the Lothians? On what river is Aberdeen situated? What is the principal river in Perthshire, and where does it fall into the sea? How does the Clyde run, and where does it fall into the sea? Where is the Pentland Firth? What are the principal mountains in Scotland?

Which is the largest lake in Britain? What lochs lie on the line of the Caledonian Canal? Where is coal most abundant? What towns engage in the cotton manufacture? The linen? Which engage in the West India trade? What is the character of the Scotch? What the established religion? What led to the Union with England?

IRELAND.

Ireland is separated from Great Britain by the Irish Sea, which contracts in the north into the North Channel, and in the south into St. George's Channel. On every other side it is washed by the Atlantic. It is about 300 miles in length, and about 182 at its greatest breadth, and contains 30,000 square miles.

Ireland is divided into four provinces, viz.:* Leinster, in the east; Ulster, in the north; Con'naught, in the west; and Munster, in the south. These are subdivided into 32 counties.

Leinster, containing twelve counties.

COUNTY.	CHIEF TOWN.	RIVER.
Dublin	Dublin	Liffey
Louth	Drogh'eda	Boyne
Wicklow	Wicklow	Irish Sea
Wexford	Wexford	Slaney
Longford	Longford	Near the Shannon
East Meath	Trim	Boyne
West Meath	Mullingar'	

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* Those letters which are printed in Italics are not sounded.

COUNTY.	CHIEF TOWN.	RIVER.
King's County	Philipstown	
Queen's County	Maryborough	
Kilkenny	Kilkenny	Nore
Kildare	Kildare	
Carlow	Carlow	Barrow
Ulster, containing nine counties.		
Down	Down Patrick	Strangford Bay
Armagh′	Armagh	
Monaghan	Monaghan	
Cav′an	Cavan	
Antrim	Carrickfergus	Carrickfergus Bay
Londonderry	Londonderry	Foyle
Tyrone	Omagh′	
Ferman′agh	Enniskillen	Lough Erne
Donegal′	Lifford	Foyle
Connaught, containing five counties.		
Leitrim	Carrick on Shannon	
Roscommon	Roscommon	
Mayo	Castlebar and Ballinrobe	
Sligo	Sligo	
Galway	Galway	
Munster, containing six counties.		
Clare	Ennis	Fergus
Cork	Cork	Lee
Kerry	Tralee′	
Limerick	Limerick	Shannon
Tippera′ry	Tipperary and Clonmel′	
Waterford	Waterford	Suir.

CAPES AND BAYS.

The coast of Ireland is deeply indented by bays, especially on the west, where it is exposed to the unbroken fury of the Atlantic; though no part of the island is distant more than 50 miles from the sea. The bays of Donegal, Sligo, Clew, Galway, the estuary of the Shannon, and Dingle Bay, on the west, are very spacious. The bay of Bantry, and the harbours of Cork and Waterford are on the south; Belfast Lough, Dundalk and Dublin bays are on the east.

Malin Head is the most northerly point of the island. Tor Head is the part nearest Scotland; and Cape Clear, the most southerly point, is usually the first land seen by English vessels homeward bound from foreign parts.

MOUNTAINS.

The principal mountains are, *MaGillicuddy's Reeks, in Kerry, which reach an elevation of 3,600 feet; and Mangerton, in the same county; the Galtee mountains, in Tipperary; Croagh Patrick, in Mayo; the Mourne mountains, in Down; and the Wicklow mountains.

LAKES.

The principal lakes in Ireland are Lough Neagh, the largest in the United Kingdom, which skirts five counties, and greatly facilitates intercourse between them; Lough Erne, Lough Corrib, Lough Ree, and Lough Derg. The lakes of Killarney, in Kerry, are celebrated for their picturesque scenery.

In Lough Derg there are several small islands, on one of which is a noted place of pilgrimage called St. Patrick's purgatory.

A remarkable feature in the geography of Ireland is, its extensive bogs, which occupy nearly three millions of acres of its surface. They are pricipally situated in a belt formed by lines drawn from Wicklow Head to Galway, and from Howth Head to Sligo.

RIVERS.

The largest river in Ireland is the Shannon, which ssues from the mountains that separate Fermanagh from Leitrim; it takes a southern course between the provinces

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* C and G printed in capitals are to be sounded hard.

of Leinster and Connaught; here it expands into Lough Allen; next it forms Lough Ree and Lough Derg; passes Killaloe: flows on to Limerick, whence it is navigable, and about 60 miles below that port falls into the Atlantic Ocean. Its course is about 170 miles.

The Suir rises in Tipperary, and receiving the Nore and Barrow, is navigable from Clonmel, and falls into the sea at Waterford.—The Barrow is navigable to Athy.

The Blackwater springs from a mountain in the county of Kerry, and falls into the Bay of Youghall.

The Bann rises in the county of Down, falls into Lough Neagh, and dividing the counties of Antrim and Londonderry, after a course of 70 miles falls into the sea below Coleraine.

The Bann is famous for its Salmon leap near Coleraine, and for its salmon fishery, which is the greatest in the kingdom.

The Liffey runs by Dublin.

The Boyne rises in King's County, and falls into the sea at Drogheda, having a course of about 50 miles.

CANALS.

The Grand Canal extends from Dublin to the Shannon, which it joins near Banagher. Its length is 87 miles.

The Royal Canal stretches westward from Dublin to the Shannon, which it joins at Tormanbury. Its length is 83 miles.

The Newry Canal completes the communication between Lough Neagh and Carlingford Bay. Another unites the Lough with Belfast.

RAILWAYS.

Though several important lines have been projected, few are as yet completed. The Dublin and Kingston line is six miles long, connecting the capital with its port. The Kingston and Dalkey line is worked upon the Atmospheric principle.

A line is constructed from Belfast to Portadown; it is laid down to the gauge recommended by the Irish Railway Commissioners, 6 ft. 2 in.

CLIMATE.

The winters are somewhat less cold and the summers less hot than in England, and the weather more changeable. Owing to its proximity to the Western Ocean the air is damp, to which the perpetual verdure of its pastures is in a great measure owing.

MINERALS.

Granite and the other primitive rocks rise more extensively to the surface than in England, and limestone resting upon these, occupies two-thirds of the surface of the island. Marble is found, principally, in Kilkenny and Galway. Coal is not an abundant mineral, and it is of inferior quality; it is wrought in Tyrone and Antrim, in Leitrim, and in Kilkenny. The metals are not extensively procured, though gold and silver, as well as the baser metals, have been found.

A remarkable range of basaltic columns, called the Giant's Causeway, is met with near Bengore Head, in Antrim. The fossil remains of an enormous elk, or moose deer, are frequently found in the bogs; the antlers of this extinct animal are sometimes ten feet between the tips.

TOWNS IN IRELAND.

☞ The Figures (1), (2), show the number of Members of Parliament respectively returned.

Antrim, Lough Neagh; linen manufacture.

Ardeé, Louth, r. Dee.

Arklow, Wicklow, Irish Sea; oyster fishery, for the Liverpool market.

Armagh, Armagh; large inland trade, chiefly in grain, linen, and yarn: archbishop primate of all Ireland. Pop. 10,245. (1.)

Athlone, West Meath and Roscommon, r. Shannon; a strong military post: conveniently situated for trade. Pop. 6,393. (1.)

Athy′, Kildare, r. Barrow and Canal; considerable traffic with Dublin by means of the canal.

Ballinasloe′, Galway; famous for its large cattle fairs.

Ballycastle, Antrim, North Channel; an exposed harbour: collieries.

Ballymēna, Antrim, r. Braid; linen trade. Pop. 5,549.

Ballyshannon, Donegal, r. Erne, which discharging the waters of Lough Erne into Donegal Bay, forms near this town a magnificent cascade; linen: large supplies of salmon sent to London and Liverpool.

Baltinglass, Wicklow, r. Slaney; druidical remains.

Banagher, King's Co., Shannon; the river is here crossed by a bridge of 19 arches, which is guarded by batteries on each side. The town is well situated for trade, having a great command of inland navigation.

Bandon, or Bandonbridge, Cork, r. Bandon; a strong garrison. Pop. 9,049.

Bangor, Down, Belfast Lough.

Bantry, Cork, Bay of Bantry; the trade of this port, once considerable, is now confined to the export of grain.

Belfast, Antrim, Belfast Lough; an important commercial town, the centre of the linen manufacture, that of cotton is spreading extensively; it exports grain and salt provisions, trades with America and the West Indies, and has much intercourse with Scotland: it possesses an academical institution, which, without the privileges, possesses most of the advantages of a university: its inhabitants are nearly all of Scotch extraction. Pop. 75,308. (2.)

Birr, or Parsonstown, King's County. Pop. 6,336.

Blessington, Wicklow, r. Liffey.

Boyle, Roscommon, r. Boyle; linen manufactories.

Callan, Kilkenny.

Carlingford, Louth; a large harbour, but a dangerous entrance: excellent oysters.

Carlow, r. Barrow; coal, grain: its butter is of the finest quality. Pop. 10,469. (1.)

Carrick, Leitrim, r. Shannon.

Carrick, Tipperary, r. Suir. Pop. 9,165.

Carrickfergus, Antrim, Carrickfergus Bay; good harbour: King William landed here in 1690, previous to the battle of the Boyne. (1.)

Cashel, Tipperary, r. Suir; the see of a bishop: its cathedral is a remarkable ruin. Pop. 7,036. (1.)

Castlebar, Mayo; linen: extensive trade in grain and agricultural produce. Pop. 5,137.

Castlemartyn, Cork.

Cav′an, Cav′an; linen manufactories.

Charleville, (*pro.* Tch-) Cork.

Charlemont, (*pro.* Tch-) Armagh, r. Blackwater.

Clogher, Tyrone; an ancient city, now a poor village.

Clonmel′, Tipperary, r. Suir; cotton manufacture, agricultural produce: Sterne born here. Pop. 13,505.

Cloyne, Cork; Dr. Berkeley, the metaphysician, was some time bishop of Cloyne.

Coleraine, Londonderry, r. Bann; salmon fishery: Giant's Causeway near. Pop. 6,255.

Cork, r. Lee; second city in Ireland: large export of mess beef, and pork and butter: great intercourse with Bristol. Pop. 80,720.

Cove, Cork, Cork harbour; its spacious harbour is much resorted to by vessels on their passage to the West Indies. Pop. 5,142.

Dingle, Kerry, Dingle Bay.

Donaghadee′, Down, Irish Channel; mail packets to Port Patrick, the distance of which is only 22 miles.

Donegal′, Donegal, Donegal Bay.

Down Patrick, Down, Strangford Bay; St. Patrick interred here. (1.)

Drogheda, Louth, r. Boyne; imports coals and goods from England: exports grain. Pop. 17,300.

Dublin, Dublin, r. Liffey; the metropolis of the island and the second city in the United Kingdom: its trade is injured by a bar across the entrance of its harbour: it exports largely corn, cattle, hides, &c.: its business is chiefly transacted with Bristol, Liverpool, and London: an university founded by Queen Elizabeth: the see of an archbishop: Archbishop Usher, and Burke born here. Pop. 232,726. (2.)

Dundalk, Louth, Dundalk Bay; muslins. Pop. 10,782. (1.)

Dungannon, Tyrone; coal mines. (1.)

Dungarvan, Waterford, Dungarvan Bay; this town supplies Dublin with fish and great quantities of potatoes: butter. Pop. 8,625. (1.)

Elphin′, Roscommon.

Ennis, Clare, r. Fergus. Pop. 9,318.

Enniskillen, Fermanagh, Lough Erne; bravely resisted James II. Pop. 5,686. (1.)

Fermoy, Cork, Blackwater; was a military dépôt during the last war with France.

Galway, (*pro.* Gaulway) Galway Bay; linen manufacture: herring and salmon fisheries. Pop. 17,275. (2.)

Gort, Galway.

Gran′ard, Longford.

Hillsborough, Down.

Kells, East Meath, r. Blackwater.

Kildare; horse-races, the Newmarket of Ireland.

Kilkenny, r. Nore; fine marble: coarse woollens. Pop. 19,071. (1.)

Killal′a, Mayo, Killala Bay.

Killaloe, (*pro.* Kil-la-loo′) Clare, r. Shannon; salmon fishery.

Killarney, Kerry, Lake Killarney; the country round the Lake is very beautiful. Pop. 7,127.

Killough (*pro.* Kil-loó) Down, Irish Sea; salt, corn, &c.

Killybegs, Donegal, Donegal Bay; a noble harbour: herring fishery.

Killyléa*gh*, Down, Strangford Lake; linen and thread.

Kilre*a*, Derry, r. Bann.

Kingston, Dublin, Dublin Bay; a fine harbour: the port of Dublin; mail packets to Liverpool and Holyhead.

Kinsale, Cork, r. Bandon; a maritime arsenal, may be called the Plymouth of Ireland. Pop. 6,918. (1.)

Knocktōpher, Kilkenny.

Larne, Antrim, Lough Larne; its harbour a valuable refuge for shipping on this coast.

Limerick, r. Shannon; exports provisions. Pop. 48,391. (2.)

Lifford, Donegal, r. Foyle; a bridge connects it with Strabane, of which it is now a dependency. Pop. 5,456.

Lisburn, Antrim, r. Lagan; a handsome town: its linen and cambrics are in much repute: the manufacture of the finer branches of the linen trade was introduced by a body of Huguenots, who settled here on the revocation of the edict of Nantes. Pop. 6,284.

Lismore, Waterford, r. Blackwater; salmon fishery.

Londonderry, r. Foyle; memorable siege against the forces of James II. Pop. 15,196. (1.)

Longford, r. Camlin; linen manufactory.

Loughre′*a*, Galway, r. Loughrea. Pop. 5,458.

Mallow, Cork, r. Blackwater; a hot spring, resembling the wells at Bristol. Pop. 6,851. (1.)

Maryborough, Queen's County, r. Barrow.

Maynooth, Kildare; St. Patrick's College, established and supported by government for the education of Roman Catholic priests.

Mitchelstown, Cork; to the west of the town is a castle, the seat of the Earl of Kingston, the most magnificent modern building in Ireland.

Monaghan, Monaghan.

Mullingar′, Westmeath; a large market for corn, butter and cattle.

Naas, (*pro.* Nace) Kildare, r. Barrow and canal.

Nav′an, East Meath, r. Boyne and Blackwater. Pop. 5,628.

Nēnagh, Tipperary, r. Nenagh; the most important town between Dublin and Limerick.

Newcastle, Limerick; also in the county of Dublin, &c.

New Ross, Wexf., r. Barrow; well situated for trade. (1.)

Newry, Down, Canal; a large and increasing town: the principal port in the island for the shipment of butter. Pop. 11,972. (1.)

Omagh′, Tyrone.

Philipstown, King's County, Canal.

Portarlington, King's County, r. Barrow; one of the best built and cleanest towns in Ireland: many gentry reside here. The Duke of Wellington and Marquis Wellesley here received the rudiments of education.

Rathke*a*lé, Limerick, r. Deel.

Roscommon, Roscommon.

Roscre'*a*, Tipperary; a place of great antiquity; was the seat of a bishopric in the sixth century; a round tower and other ruins: manufacture of coarse woollens; large trade in grain.

Skibbereen, Cork, r. Ilen: linen manufacture.

Sligo, Bay of Sligo; considerable trade. Pop. 12,272. (1.)

Strabane, Tyrone, r. Mourne. Pop. 5,456.

Thomastown, Kilkenny, r. Nore.

Thurles, Tipperary, r. Suir. Pop. 7,523.

Tipperary, Tipperary. Pop. 7,370.

Tralee', Kerry, Bay of Tralee; fisheries. Pop. 11,363. (1.)

Trim, East Meath, r. Boyne.

Tu'am, Galway; the see of a bishop: the Roman Catholic cathedral is a fine modern structure. Pop. 6,034.

Waterford, Waterford, r. Suir; butter, salt provisions, linen, &c., are exported: steam communication to Bristol: Henry II. landed here in 1172 to take possession of Ireland. Pop. 23,216. (2.)

Westport, Mayo, Clew Bay.

Wexford, Wexford; woollen manufactories. (1.)

Wicklow, r. Leitrim; considerable trade to Dublin.

Youghall, (*pro.* Yaw'll) Cork, r. Blackwater; commodious harbour and considerable trade: here the potato was first planted in Europe, having been introduced from America by Sir Walter Raleigh. Pop. 9,939. (1.)

POPULATION.

The Celts appear to have been the original inhabitants of Ireland, who being driven to the western shores of

Gaul, passed into Britain, and thence into Ireland. These seem to have been followed by a number of Scythians, who had been driven from the north of Spain. The Saxons and Danes also found their way into this island.

The population is 8,175,124, being 272 inhabitants to a square mile. A century ago it was only 2,000,000.

MANNERS, LANGUAGE, ETC.

The Irish are robust, active, and capable of enduring great labour. They are acute but thoughtless; generally kind but irascible; affectionate to their kindred and attached to the place of their nativity. The native Irish (a dialect of the Celtic) is still extensively spoken. Education is very much neglected, and the greater part of the peasantry are sunk in poverty and wretchedness. The inhabitants of the north-east of Ireland are of Scotch extraction, and retain the manners and habits of their ancestors.

RELIGION AND GOVERNMENT.

The greater part of the Irish are Roman Catholics. The English Church is the established one, under two archbishops and twelve bishops. Presbyterianism prevails in Ulster.

Henry II. rendered Ireland subject to the English crown; but it was not till 1801, that the legislature of Ireland was completely incorporated with that of England.

Twenty-eight peers, elected for life, represent the temporal lords, and one archbishop and three bishops, who sit in rotation, represent the spiritual lords in the House of Lords; 105 members are sent to the House of Commons of the Parliament of the United Empire. The executive government is vested in a Lord Lieutenant deputed by the crown, and who holds office during the royal pleasure. A numerous armed force, generally exceeding 20,000 men, is maintained in Ireland.

ANCIENT NAME.

Erin appears to have been the original name, which was modified by the Romans into Ierne and Hibernia.

Ireland contains some interesting antiquities, of which the round towers are the most remarkable. These are slender circular buildings upwards of 100 feet high; when perfect they terminate in a conical roof, with four small windows near the top. The sites of 118 of these peculiar buildings have been discovered: they are supposed to have been connected with the worship of the sun in Pagan days.

QUESTIONS FOR EXAMINATION.

How does Ireland lie from England? Into how many provinces is it divided? What are the counties and capitals of Leinster? Name those of Ulster. What are the counties of Connaught? How many counties are three in Munster, and what are their names?

What are the bays or loughs on the north? What on the east? On the south? On the west? What elevation do its mountains reach? Which is the largest lake? How many acres of bog are there in Ireland?

Which is the largest river in Ireland? Where does it fall into the sea? On what river is Waterford? On what rivers are Dublin, Londonderry, and Drogheda? What county in Ireland is nearest Scotland? In what county is Antrim?

Describe the manners of the Irish. What is the prevalent, and what the established religion? When was the legislature of Ireland incorporated with that of England?

MANUFACTURES AND COMMERCE, COLONIES, AND GOVERNMENT OF THE BRITISH ISLES.

MANUFACTURES.

The earliest staple commodity of England was tin, first introduced into commerce by the Phœnicians, 500 years before the birth of Christ. This metal principally abounds in the county of Cornwall, and is very rare in other countries. The mines in Malaya, however, which have but recently been wrought, are very rich, and are likely to be powerful competitors with those of Cornwall.

The woollen manufactories are of great importance, and extend themselves over the whole West Riding of Yorkshire. In Wiltshire superfine broad-cloths are manufactured. During the reigns of the early Edwards most of the English wool was sent to Flanders to be *manufactured;* now, besides using all the fleeces of the immense

f sheep reared in this country, large quantities of fine wool
rted from Germany and Spain, and more recently from New
ales and the Cape. The annual produce of the woollen manufac-
stimated at upwards of twenty-two millions of pounds sterling.
otton manufacture is diffused far and wide, forming a grand
f industry and prosperity. Manchester is the chief emporium
ade. By the aid of machinery, goods are produced, which,
this assistance, would require the aid of 80 millions of men.
est quantity and the finest quality of cotton wool come from
ted States. Brazil, the East Indies, and Egypt also supply
antities. The manufactured goods, besides supplying home
tion, are chiefly sent to the United States, the East and West
Brazil, Turkey, and Greece. The annual produce of the
anufacture is stated to exceed in value £35,000,000.
is manufactured in large quantities, by machinery, in Notting-
which the greater part is sent to Hamburgh, Germany, Bel-
ance, Italy, and America.
gham is also noted for the manufacture of silk and cotton
s. Worsted stockings are chiefly made in Leicestershire.
anufacture of silk has very much increased of late. In plain
stantial goods the English excel the French, their only rivals
rade, though in fancy goods the French are superior. The
rial is brought in largest quantity from India; but the import
key, Italy, and France is considerable. The chief export of
tured silk is to the United States. The annual value of the
facture is estimated at £10,000,000.
has, to a great extent, supplanted the use of linen. Dundee
porium of the linen trade; the manufacture of it is also widely
throughout Ireland. The raw material is chiefly procured
ssia and Holland. The annual produce of this manufacture is
l at £8,000,000.
anufactures of iron and copper have become great sources of
wealth. Since the method of smelting iron by means of coal
f wood has been introduced, the quantity of iron made in Bri-
ncreased greatly. It now manufactures as much iron as all
f the world put together, and imports merely the finest kinds
eden, Russia, &c., for the manufacture of steel. Sheffield
been remarkable for its cutlery ware. Birmingham, from the
nd beauty of the articles which are manufactured there, has
ed *the toy-shop of Europe.*
t earthenware forms an extensive article of exportation; Staf-
is the principal seat of this manufacture.

The manufactures of glass and fine steel, clocks, watches, &c., are deservedly eminent and extensive.

The whole value of the manufactures of all kinds produced annually in Great Britain, is reckoned to be about 150 millions of pounds sterling.

COMMERCE.

From the days of Alfred, the shipping of the empire has always been made an object of primary importance. At present the British navy rides mistress of the seas, and not a port in any portion of the world eludes the vigilance of the British merchant. The number of ships in the merchant service of the empire is about twenty-four thousand, having a tonnage of two and a half millions. Of the sea-ports in Britain, the greatest amount of tonnage belongs to London: Newcastle ranks next; then follow, in order, Liverpool, Sunderland, Hull, Whitehaven, Whitby, &c. If the rank of a port be estimated by another test, the amount of duty paid at the customhouse, London again stands first, and Liverpool, Bristol, Hull, &c., follow in order.

The value of British produce, or manufacture, exported to foreign parts may be stated at thirty-seven millions of pounds sterling.

Cotton stuffs and yarn are the most important articles of export; they at present amount in value to about half of the entire export of British produce and manufactures. The articles next in amount are woollen goods, linen, hardware, refined sugar, iron and steel, &c.

Besides the export of British goods, colonial and other foreign products, imported into England, are in considerable quantities re-exported.

The principal articles of import, (named in the order of their importance,) are sugar, tea, corn, timber, and naval stores, cotton, wool, woods, and drugs for dyeing, wine and spirits, tobacco, silk, tallow, hides, &c.

Great as is the foreign trade of Britain, the home trade is greater. Even in the article of cotton as much is consumed at home as is exported.

COLONIES.

The territories belonging to the British are numerous and extensive.

In Europe, Gibraltar and Malta are important possessions in a military point of view; the Ionian Isles, to the west of Greece, are under the protection of the British.

In Asia, India, Ceylon, part of the Burmese empire, Malacca, and Penang, New Holland, Van Diemen's Land, and New Zealand.

In Africa, the Cape of Good Hope, Sierra Leone, St. Helena, the Isle of France, &c.

In America, Newfoundland, Canada, and nearly the whole of the continent to the north of it; Jamaica, the Bahamas, Barbadoes, Trinidad, St. Kitts, with several other West India Islands, and the colonies of Demerara, Berbice, and Honduras, on the continent of South America.

On the whole, Britain possesses territory nearly three times as extensive as the Roman empire when in its greatest glory. The total amount of population in Britain and its dependencies is 155 millions.

GOVERNMENT.

The government of Great Britain is a limited monarchy. The executive power is vested in the king; the legislative is shared with him by the peers of the realm, and the representatives of the commoners. No act of either house of parliament can become a law without the consent of the other and of the king. The king has the power of assembling, or proroguing, or dissolving parliament at his pleasure; he appoints the ambassadors; he declares war and makes peace; he forms treaties and alliances; and it is his prerogative to extend mercy to condemned criminals.

QUESTIONS FOR EXAMINATION.

What was the earliest staple commodity of Britain? Where does tin principally abound? Where is the woollen manufacture chiefly carried on? Which is the emporium of the cotton manufacture? For what manufactures is Nottingham celebrated? What nation rivals the British in the silk trade? Which is the emporium of the linen trade? What circumstance has led to the increased manufacture of iron in Britain? Give the total value of British manufactures.

What number of merchant vessels belongs to Britain? Name the ports to which the most tonnage belongs. What is the most important article of export? What other articles does it export? Name its imports.

What territories does Britain possess in Europe? In Asia? In Africa? In America?

What is the government of Britain? Name some of the prerogatives of the king.

DENMARK.

BOUNDARIES.

W. North Sea.—N. Skager Rack.—E. Kattegat and Baltic.—The river Elbe separates it from Hanover on the

S. It consists of the peninsula of Jutland, the large islands of Zealand and Funen, and several small isles.

EXTENT.

It is situated between 53½° and 57¾° N. lat., and 8° and 12½° E. long. Its length is 300 miles: its breadth, from 90 to 100; and it contains nearly 21,000 square miles.

COAST LINE, CAPES, ETC.

The Skaw is a remarkable promontory on the north. The Horn is the most westerly point.

The country is much intersected by the surrounding sea. The Lymfiord overflows a great portion of the north. The Ringkioping Fiord is on the west. By the interposition of Zealand and Funen, the Kattegat is divided into three channels, the Great and Little Belt and the Sound. The Sound is the passage usually taken by vessels entering the Baltic; at Elsinore it is only four miles across.

RIVERS.

There are several small streams in Denmark, but no large rivers. The Eider, which flows into the North Sea, is the principal; it is met at Rendsburg by a canal, which conducts the navigation to the Baltic.

MOUNTAINS.

The country is flat; there is not a hill in it more than 1000 feet above the level of the sea.

CLIMATE.

The climate is moist and temperate, but the frost in winter is sometimes very severe: the change from winter to summer is so sudden that spring is almost unknown.

COMMERCE.

Denmark possesses fine rich pastures, on which large herds of cattle are fed; it has few considerable manufactures, and its commerce is in a rather declining state. It *imports* pitch and tar from Sweden; flax and hemp from

Russia; wines and brandy from France; West India produce; and tobacco from America. Coal, earthenware, and salt are the principal articles of import from England. The exports consist, for the most part, of the produce of the soil, as horses, cattle, corn, rape-seed, butter, cheese, tallow, hides, with fish, &c.

PROVINCES.

It is divided into the following provinces:—Jutland, Sleswick, Holstein, (to which is now annexed Lauenburg,) Zealand, Funen, and Laland.

TOWNS.

Copenhagen, on the Sound; capital of the Danish dominions, and one of the most elegant cities in Europe; seat of an university: bombarded by the British in 1807. Pop. 119,292.

Altona, on the Elbe; second city in the Danish dominions: herring and whale fisheries.

Elsinore, on the Sound; here all vessels, on passing the Sound, pay toll to the king of Denmark: the scene of the tragedy of Hamlet.

Aalbourg, on the Lymfiord, is the seat of a college and a bishopric: the city is surrounded by moats: eels are abundant, hence the name of the town, which signifies eel-town.

Kiel, (*pro.* Keel) a sea-port of Holstein; the seat of an university.

Rensburg is the principal fortress of continental Denmark; it formed the limit of the Roman empire.

Aarhus, Sleswick and Flensburg are other sea-ports.

COLONIAL POSSESSIONS.

Iceland, a large island in the Northern Atlantic, belongs to Denmark. The whole island is one mass of volcanic matter, eruptions and earthquakes being frequent and terrible. The Geysers, or hot springs, throw up jets of hot water to the height of 80 or 100 feet, with the noise of thunder. The climate is exceedingly cold, though tempered by the ocean, and the seasons are variable. The island is destitute of trees, and the hardiest species of grain seldom ripen. Iceland was the seat of learning when continental Europe was immersed in darkness, and the intelligence and literary taste of the inhabitants are still remarkable. The Icelander's attachment to his bleak and barren isle is unconquerable. The inhabitants chiefly live by fishing.

Greenland, a comparatively unexplored country, on the east coast of America, and the Ferroe islands, to the north-west of the Shetland Isles, belong to the Danes. In the West Indies they possess St. John, St. Thomas, and St. Croix (Santa Cruz); and Tranquebar, in the East Indies.

POPULATION.

The population is 2,132,000. The Danes are the descendants of the ancient Cimbri, who, having several times defeated the Romans, were themselves overcome by Marius, and who afterwards, under the name of Jutes and Angli, invaded England. Many of the Danish names bespeak a Saxon origin, as Zealand, (sea-land,) Laland, (low-land,) &c. In the eastern part of Sleswick there is still a province named Angeln.

MANNERS, ETC.

The manners of the superior ranks of the Danes differ little from those of similar ranks in other parts of Europe; the lower orders were formerly held in a state of vassalage, but they are now emancipated. Dancing is a very favourite amusement, and Germany supplies them with itinerant musicians. Education is a matter of serious and general attention. Tycho Brahe, to whom astronomy is so much indebted, was a Dane.

GOVERNMENT.

Till recently an absolute monarchy; but in 1834 the late king, Frederick VI., relinquished a large share of the royal power, and gave to his people a free constitution. The present king is Christian VIII. The religion is Lutheran.

ANCIENT NAME.

Chersonesus Cimbrica was the ancient name of Jutland.

SWEDEN AND NORWAY.

BOUNDARIES.

N. by the Arctic Ocean.—E. by Russian Lapland, the Gulf of Bothnia, and the Baltic.—S. by the Skager Rack, Kattegat, and Baltic.—W. by the North Sea.

EXTENT.

It extends from 55° to 71° N. lat., and from 5° to 30° E. long. It is 1,150 miles in length, and 500 in extreme breadth, and contains 340,000 square miles.

COAST LINE, ISLANDS, ETC.

The Naze* is a remarkable headland in the south of Norway; Nordkung, in Finmark, is the most northerly point of the continent of Europe; North Cape, on the island of Mageröe, is the most northerly point of Europe not continental. The coast of Norway is extremely rugged; innumerable islands stud its western shore, which diverting the current of the ocean, give rise to the whirlpool of Maelstrom, so much dreaded by mariners. The islands of Gothland and Œland belong to Sweden.

It is an ascertained fact that the coast of Sweden bordering upon the Gulf of Bothnia is progressively rising above the level of the sea.

MOUNTAINS, RIVERS, ETC.

There are few navigable rivers, but many impetuous torrents, which, falling from the rocks and mountains, discharge themselves into the Baltic. The Tornea separates Sweden from Russia, and falls into the Gulf of Bothnia. The Gotha discharges the waters of Lake Wener into the Kattegat. There are numerous lakes; the principal are, Wen′er, which is 90 miles long and 36 broad; and Wet′er, which is 82 miles in length and 16 in breadth; and Lake Mæler, an inlet of the Baltic, on which Stockholm stands. This is a mountainous country; the Langfiall and Dofrefiall mountains separate Sweden from

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* Signifying nose, and equivalent to the English *Ness*.

Norway. It has been estimated that two-thirds of Sweden are occupied by lakes, mountains, and forests.

CLIMATE.

Its latitude renders it a cold country; but its peninsular form makes its winters less severe than in the corresponding latitudes of Russian Siberia, or even than in some parts of Germany. The winter, though rigorous, is pleasant and salubrious; the cold is not felt to be excessive, except when the wind blows over the mountainous regions of Siberia, or from the ice-fields of the north. Winter is the most favourable season for commercial activity and social enterprize; the hard snow and ice affording an easy passage over the rugged country and lakes and rivers. The heat of their short summers is very great, owing to the length of time the sun continues above the horizon, and vegetable life passes through its various stages with astonishing rapidity. At the North Cape the sun, in summer, does not set for upwards of ten weeks; the accumulated heat is such that mosquitoes and other troublesome insects crowd the air. Spring and autumn are both unknown.

COMMERCE.

The chief wealth of Sweden arises from its mines. Swedish iron is of very superior quality, and with timber forms the chief article of export. Its timber is inferior to that from the southern parts of the Baltic. In the silver mines at Kongsberg large masses of native metal* have been found. Its imports consist of colonial produce and British manufactured goods. Fish salted or in the open air is the chief export from Norway; ent in large quantities to Spain, Italy, and other ı Catholic countries. The lobster fishery is con- on a great scale; upwards of 1,200,000 lobsters nt annually to London. Norway imports colonial :e, manufactured goods, and also corn, the soil mate being unfavourable to the growth of grain.

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* By native metal is meant the pure metal found naturally. Most of the metals are met with in the earth in a state of combination with other substances; thus, copper and quicksilver are generally taken from the mine in the form of ores which consist of sulphur and copper, or sulphur and quicksilver, and require to undergo the process of reduction; when they are found in the pure state they are said to be native.

PROVINCES.

ɜn is divided into Sweden Proper, Gothland, West Norland, Lapland, and West Bothnia. Finland and East Bothnia united to Russia. The provinces of Norway are, Christian- gerhuus, Bergen, Drontheim, Nordland, and Finmark.

TOWNS.

lm, the capital, is situated on Lake Mæler, at its junction with altic; it is a handsome city, and is built upon several islands: an excellent harbour: it possesses half the foreign trade of en, and is the principal manufacturing town of the kingdom. 85,000.

ıa, the capital of Norway, at the head of an inlet of the r Rack. Its university is an important one.

urg, Sweden, on the Kattegat; a large and commercial city: le with England is extensive.

ıe ancient capital of Sweden, is the only archbishop's see in ngdom, and is celebrated for its university, in which Linnæus, eat naturalist, was once professor.

situated on the western extremity of the country, is the first ercial city of Norway.

na, nearly at the southern extremity of Sweden, is the prin- lépôt of the Swedish navy.

n the Gulf of Bothnia; Norkioping, on the Baltic; Malmo, e Sound; and Drontheim, on an inlet of the ocean, are sea- ɔf some trade.

COLONIAL POSSESSIONS.

Bartholomew, in the West Indies.

POPULATION.

ugh the most extensive empire in Europe, except , its total population is only about five millions.

GOVERNMENT, ETC.

Though Sweden and Norway form one geographical region, and are under the same monarch, they possess different constitutions. Both have the form of a free government. In Sweden, the legislative assembly partakes more of an aristocratic, and in Norway of a democratic character. The present king is Oscar II. The religion is Lutheran.

CHARACTER.

The Swedes and Norwegians are quick of apprehension, lively, frank, and of unflinching fidelity; the higher classes are polished in their manners, the lower are simple, industrious, and hospitable. This is said to be a well-educated country. Linnæus was a Swede.

ANIMALS.

The most formidable of its wild animals are the bear and the wolf. The elk is now a rare animal. The eagle and the falcon are frequent in the northern parts. The eider duck abounds on the shores of Norway, whence half of the down that is used is supplied. The domestic animals are small but hardy. The rein-deer constitutes the chief wealth of the inhabitants of Lapland, where it abounds.

ANCIENT NAME.

Scandinavia, but it was little known to the ancients.

RUSSIA.

BOUNDARIES.

N. by the Arctic Ocean.—E. by Asia.—S. by the Black Sea and Turkey.—W. by Austria, Prussia, the Baltic and Sweden.

The boundary line between Europe and Asia has been variously laid down, the following is perhaps the most natural. The Ural mountains; the river Ural, throughout its whole course; the Caspian

Sea, from the mouth of the river Ural to the mouth of the river Kuma; the river Kuma, and the river Kuban, then complete the line as far as the Black Sea.

The river Dniester was long the boundary between the Russians and the Turks; the Russians have, by their conquests, extended their territories as far as the Pruth and the Danube.

EXTENT.

It lies between 44° and 69° N. lat., and 20° and 60° E. long. Its length is 1,700 miles, and its breadth 1,500. It contains 1,600,000 square miles.

Though European Russia occupies the half of the continent of Europe, this is but a small part of the whole Russian empire, which extends to the extreme limits of Asia on the east, and is bounded by Tartary and Mongolia on the south. The Russian is the most extensive empire that was ever comprised under one government; it spreads over nearly three times the space occupied by the dominions of Rome.

COAST LINE AND ISLANDS.

Russia has but a small portion of coast line, yet it has ports on the White, Baltic, Black, and Caspian Seas.

The islands of Nova Zembla (or New Land) in the Frozen Ocean, and of Osel, Dago, and Aland, in the Baltic, belong to Russia.

MOUNTAINS AND PLAINS.

The Ural mountains extend for 1,200 miles between the two continents; but probably do not attain an elevation exceeding 8,000 feet. The mountains of Valdai are in the west, and give rise to the Wolga and other rivers. A distinguishing feature of Russia is its immense plains, called steppes. The most noted are the following. 1. The marshy desert between the Petchora and the Dwina. 2. A sandy plain interspersed with salt lakes, between the Dnieper, the Don, and the Azof. 3. The plain bounded by the Wolga and the Ural, stretching to the Caspian.

RIVERS.

Russia is distinguished for its majestic rivers. Next in importance to the Wolga, the prince of European rivers, is the Don, which rises to the south of Moscow and falls into the Sea of Azof, after a course of 1,080 miles. The Dnieper, the ancient Boristhenes, rises in the government of Smolensk, in the immediate vicinity of the sources of the Wolga, the Baltic Dwina, and the Don, and after a course of 1,000 miles, falls into the Black Sea at Cherson. This river flows through some of the most fertile provinces of the empire, but its navigation is much impeded by cataracts. The Dwina, formed by two branches which rise in the government of Vologda, pursues a course of 400 miles through a cold marshy region to the White Sea at Archangel. The Petchora falls into the Arctic Sea. The Neva connects Lake Ladoga with the Gulf of Finland. The principal lakes are Ladoga, the largest lake in Europe, Onega, the next in size, and Tchudsk or Peypus.

CLIMATE.

Russia presents all the various climates in Europe, from that of the frozen regions of Lapland to the mild temperature of Italy.

The northern Dwina is frozen for half the year; the Neva from November to April; the rivers of the central parts are always frozen during winter, whilst the rivers and streams of the south are dried up during the summer. The usual extreme of heat at St. Petersburg, is 90° Fahr., and of cold 20° below zero.

COMMERCE.

The commerce and manufactures of Russia have been increasing ever since the time of Peter the Great. Its facilities for commerce are very great. Besides having ports on seas so widely apart, the extent of its internal navigation contributes to its prosperity. By means partly of rivers and partly of canals, St. Petersburg is connected with the Caspian Sea. The iron and furs of Siberia, and the teas of China, are received in the same way.

The most important article of export is tallow, which is sent in very large quantities chiefly to England. It also exports hemp and flax, iron and copper; grain, particularly wheat; timber, potashes, furs, leather, &c. The imports are, sugar, coffee, dye woods, cotton stuffs, and yarn, (the principal article sent from England,) wine, coal, &c.

The merchants of Russia are chiefly foreigners, the greatest part of whom are English. None but natives are permitted to engage in the internal commerce of the country.

PROVINCES.

Russia is divided into 50 governments, which are nearly all named after the chief town in the district. Finland, formerly a part of Sweden, is now united to Russia. Poland, once an independent nation, was attacked during a period of civil war by Russia, Prussia, and Austria, and eventually partitioned amongst them—the largest portion fell to the share of Russia.

TOWNS.

St. Petersburg, situated at the confluence of the Neva with the Gulf of Finland; was founded by Peter the Great in 1703: its situation is favourable for commerce, but the ground it stands on is low and swampy, and subject to inundations of the Neva: in point of architectural beauty it is not unworthy of the capital of the largest empire in the world. Pop. 480,000.

Moscow, nearly in the centre of European Russia, is the second city in the empire, and was long the capital: burnt in 1812, to prevent its occupation by the French. Pop. 348,000.

Warsaw, the capital of Poland.

Cronstadt; situated about 20 miles below St. Petersburg, and is in some measure the port of that city, as large vessels cannot get up to the capital: the principal dépôt of the Russian navy.

Archangel; the most northern port of any consequence in Europe: its trade has much declined since the founding of St. Petersburg.

Odessa, is a new and rising port upon the Black Sea: supplies Constantinople and the Levant with wheat.

Riga, on the Dwina, nine miles from the sea; a port of extensive trade: Riga flax is esteemed the best in Europe.

Novogorod, to the south of St. Petersburg, was a town of great trade when the Hanseatic league was at its height.

Tcherkask, on the Don, near its mouth; the capital of the Don Cossacks; it is surrounded by water and marshes.

COLONIAL POSSESSIONS.

No colonies of importance belong to this empire. Spitzbergen, a group of rocky and mountainous islands in the Arctic Ocean, is claimed by Russia.

POPULATION.

European Russia contains 59 millions of inhabitants.

Besides the Russians who form the great bulk of the population, numerous tribes are found throughout its extensive confines. The principal are the Fins and Laplanders, who occupy the northern parts of Russia and of Sweden; the Cossacks, a valiant and martial race, who occupy extensive regions on both sides of the Don; and the Tartars, with some other Asiatic nations, who dwell upon the eastern confines.

CHARACTER.

The Russians are hardy, vigorous, and patient of labour, cheerful in their disposition though not sprightly. The great mass of the people are but just beginning to emerge from a savage life, and are in a state of abject subjection to the nobility. The peasants are considered as the absolute property of the nobles, and are not permitted to marry or to remove from the soil without their consent. The Russians are not cleanly, and are much addicted to the use of spirituous liquors.

GOVERNMENT.

A despotic monarchy. The present emperor is Nicholas.

RELIGION.

The established religion is that of the Greek Church, which resembles in many points the Roman Catholic, but rejects the supremacy of the Pope and the use of images. Pictures are, however, made much use of in their worship, and their fasts are long and rigorous. The supremacy is vested in the emperor.

ANIMALS.

In so extensive a country animals with habits as different as the rein-deer and the camel are found. Bears and *wolves* are destructive in the north; wild boars fatten upon the steppes of the Wolga; and buffaloes are numerous towards the south. The sturgeon, from whose air bladder and sound the finest kind of isinglass is prepared, abounds in the Wolga and some other rivers.

ANCIENT NAME,

Sarmatia; but it was almost unknown to the ancients.

FRANCE.

BOUNDARIES.

N. by the British Channel and Belgium.—E. by Germany, Switzerland and Italy.—S. by the Mediterranean and Spain.—W. by the Atlantic and Bay of Biscay.

France is well protected by natural boundaries on nearly all sides. It is most exposed on the N.E. to invasion, as a mere arbitrary line there separates it from Belgium and Rhine Prussia. The Rhine, between Strasburg and Bâle, separates it from Baden; the Jura mountains from Switzerland; and the mountains of Piedmont and Savoy from Sardinia.

EXTENT.

Between 42° and 51° N. lat., and 5° W. and 8° E. long. Its length is 600 miles, and its breadth 560. It contains 204,000 square miles.

The encroachments which the French, under Napoleon, made upon Holland, Germany, Switzerland, and Italy, increased for the time the size of the kingdom to 300,000 square miles.

CAPES, BAYS, AND ISLANDS.

France is a compact country, little encroached upon by the sea. Cape La Hog*ue*, and the promontory on the extremity of which Brest stands, are the most striking headlands. The Gulf of Lyons is on the south. The island of Ushant is off the coast of Finisterre; Bellisle is not far from the mouth of the Loire; the islands of Ré and Oleron are near the mouth of the Charente.

The large island of Corsica is in the Mediterran forms one of the departments of the French empi is mountainous, a part of it is covered with fores it abounds in iron, copper, lead, and other metals. poleon was a native of this island.

MOUNTAINS.

France may be called a level country, thou ranges of mountains may be specified, the Cevenn the Vosges.

The Cevennes branch off from the Pyrenees, exclude the s the Garonne from access to the Mediterranean, and strik wards to join the Vosges, dividing the Rhone and the Saon one hand, from the Loire on the other.

A branch from this range extends itself between the Allier, of the Loire, and the source of the Dordogne; it rises in Mo to an elevation of 6,000 feet, a mountain which is capped wit great part of the year.

The Vosges may be traced from the N.E. extremity of they run for some distance parallel with the Rhine, and th off to meet the Cevennes, dividing the basin of the Saone fr of the Seine, Meuse, and Moselle.

RIVERS.

The four largest rivers in France are the Loi Rhone, the Seine, and the Garonne.

The Loire has its origin in the streams which fall from the C and the Mount d'Or range. For some distance it runs nearl but on passing Orleans, where it becomes navigable, it pursue erly direction; and flowing past Blois, Tours, and Nantes, it f the ocean at Painbœuf. Its course is 500 miles. The entra the Loire is much impeded by sand-banks, which accumulate

The Rhone rises from the Alps in Switzerland, crosses the Geneva, and enters France; here, hemmed in by the Cev turns to the south and directs its course to the Mediterranea one of the most rapid of the European rivers. The Saone, risi the mountains of the Vosges, a slow and placid stream, joins bulent Rhone at Lyons. The united rivers pass Vienne, Avignon, and Arles, and enter the sea by four branches, the na of which is much impeded by accumulations of mud and sand.

The Seine rises near St. Seine, in the department of Côte d'Or. Near Paris it receives the Marne and the Oise, and then proceeds by a tortuous course to the British Channel, into which it falls at Havre de Grace. It passes by Troyes, Melun, Paris, and Rouen.

The Garonne derives its chief supplies from the Pyrenees. The Lot and the Dordogne, which join it from the north, rise in the Cevennes and Mount d'Or. It runs by Toulouse, Agen, and Bordeaux, and below that place falls into the sea. After being joined by the Dordogne it becomes an estuary and assumes the name of Gironde.

CANALS AND RAILWAYS.

There are several canals in France. The Canal de Briare connects the Seine with the Loire, and the Canal du Centre joins the Loire with the Saone. By this means the Mediterranean, the Ocean, and the British Channel are united. The Rhine and Rhone canal joins the Saone with the Rhine. The most noted canal in France is the Languedoc; commencing at the Bay of Languedoc, it enters the Garonne near Toulouse, and thus connects the Mediterranean with the Atlantic; it is 126 m. long.

The railway system has been introduced into France, and will soon become general. The principal lines already executed are the Paris and Rouen and the Paris and Orleans railways.

CLIMATE.

The climate of France is favourable to the growth of most of the vegetable products of the earth. The northern part resembles the climate of England, producing grain and the hardy fruits, but is not favourable to the growth of the vine. The middle, though warm enough for the vine, is unfavourable to maize. The southern yields wine in abundance, as well as maize, olives, and oranges. The summer is hotter at Paris than at London, but the winter is colder.

MINERALS.

France is not so rich in minerals as England. Iron abounds in all the northern provinces; lead, containing silver, is procured in Brittany. Coal has been in various places, but is not wrought to a great

COMMERCE.

Woollen, silk, and linen are staple manufact lace, gloves, and trinkets are noted. Lyons is cipal seat of the silk manufacture. France ann duces wine amounting in value to about 40 milli ling ; it is chiefly produced in the region of the and exported from Bordeaux. Brandy forms export to England, the principal distilleries are nac, on the Charente. Its chief imports are colc ducts. Brass and copper articles are the most i from England ; and next to these are cottons, hardware and cutlery, horses, tin, &c.

PROVINCES.

France was formerly divided into provinces, the revolution it has been divided into 87 dep which are named, for the most part, from t which water them.

TOWNS.

Paris, the metropolis of the country, is built on the ba islands of the Seine: its general appearance is inferior t though its public walks, monuments, and buildings exci miration of strangers; the palace and gardens of the Tu Cathedral of Notre Dame, and the cemetery of Père la particularly worthy of attention; it has recently been st tified. Pop. 1,000,000.

Lyons, situated at the point of junction of the Rhone with t the ancient Lugdunum; it was one of the principal ci Roman world; the emperors Claudius and Caracalla wer it: it is the principal manufacturing city in France, and Europe for the production of silk goods. Pop. 200,000.

Marseilles, the most flourishing city of the south of France, the most ancient cities of Europe; in the days of Ci styled the " Athens of Gaul": it has a good harbour grand emporium of the commerce between France and th bordering on the Mediterranean; it is now the principal the intercourse carried on by steam ships with Malta, Alexandria, and Constantinople. Pop. 170,000.

Rouen, r. Seine; the principal seat of the French cotton manufacture; its cathedral, one of the noblest in France, contains the tomb of Richard Cœur de Lion. Pop. 100,000.

Bordeaux, on the Garonne, about 75 miles from its mouth; exports dried fruits, wine and brandy; this city, with the duchy of Guienne, of which it was the capital, was long in the possession of the English; the Black Prince and Richard II. born here. Pop. 99,000.

Nantes, a well-frequented port on the Loire; admits vessels of 200 tons: the celebrated edict of Henry IV., giving toleration to the Protestants, issued here in 1598; the scene of the atrocities of Carrier during the reign of terror. Pop. 77,000.

Lille, or Lisle, a strongly fortified town in the department of Nord; cotton manufacture. Pop. 72,000.

Toulouse, an inland town of great antiquity on the Garonne; a sanguinary contest took place in its vicinity in 1814 between Wellington and Soult, when the former was victorious. Pop. 77,000.

Amiens, an ancient town on the Somme; has considerable manufactures of cotton, linen, and velvet: the peace between England and France in 1802 was concluded at Amiens: Peter the Hermit born here; noble cathedral. Pop. 44,405.

Metz, a fortified town on the Moselle. Pop. 40,000.

Orleans, on the Loire; besieged by the English in 1426; an university; beautiful cathedral. Pop. 40,000.

St. Etienne, in the department of Loire; extensive manufactures of fire-arms, hardware, ribbons, velvet, &c. Pop. 46,000.

Nismes, in Gard; abounds in Roman antiquities, the most striking of which are an amphitheatre and an aqueduct; the Emperor Antonine was born here. Pop. 41,000.

Strasburg, on the Ill, a tributary of the Rhine; the steeple of the cathedral is 465 feet high, being 7 feet higher than St. Peter's at Rome, and 5 feet higher than the Great Pyramid. Pop. 58,000.

The Population of the following exceeds 30,000.

Avignon, r. Rhone; the seat of an archbishopric, and the residence of the Popes from 1305 to 1377.

Caen, on the r. Orne, which flows into the English Channel; William the Conqueror buried here. Pop. 37,000.

Clermont, in the department of Oise; an university; mineral springs; birth-place of Pascal. Pop. 32,000.

Rheims, in Marne; the see of the primate of France: in its cathedral, which is one of the largest and finest in Europe, the coronation of the kings of France has usually taken place; the centre of the manufacture in France of woollen stuffs; champagne wine is chiefly produced in the neighbourhood of Rheims.

Toulon, on the Mediterranean; large harbour; centre of the naval force of the Mediterranean; exports dried plums, wine, &c.

Angers, r. Mayenne, near its confluence with the Loire; surrounded by massy walls built by John, King of England.

Montpellier, near the Gulf of Lyons; beautifully situated and has magnificent public walks and fountains; formerly much resorted to for its salubrious climate by invalids from England; an university.

Nancy, near r. Meurthe, a feeder of the Moselle; the residence of Stanislaus when driven from the throne of Poland; Charles the Bold fell under its walls in 1447.

Rennes, r. Vilaine, at its junction with the Ille; formerly the capital of Brittany; sail-cloth.

Brest, a sea-port on the western promontory of France possessing a commodious and impregnable harbour; principal station of the French Channel fleet.

The Population of the following Towns exceeds 20,000.

Arras, a strong town in the department of Calais; the birth-place of the notorious Robespierre.

Dijon, in Côte d'Or; the centre of the trade in Burgundy wine, usually esteemed the finest in the world.

Dunkirk, (i. e. the church on the downs,) a sea-port E. of Calais.

Le Havre, (formerly Havre-de-Grace,) at the mouth of the Seine; may be denominated the sea-port of Paris; trade with the French Colonies and the United States.

Poictiers, the chief town of Vienne: battle fought here in 1356.

Besançon, r. Doubs; one of the bulwarks of France on the side of Switzerland, is very strongly fortified; a Roman triumphal arch still remains: watch-making.

Boulogne, St. of Dover; much resorted to by English visitors: in 1805 Napoleon collected a large flotilla and army to invade England.

Cherbourg, English Channel, nearly opposite the Isle of Wight; a great naval arsenal and an important place of refuge for French ships in time of war.

Limoges, r. Vienne; important manufactures and inland traffic.

Montaubon, r. Tarn; near its junction with the Garonne: distinguished for its early adherence to the Huguenots and its great sufferings on their behalf.

St. Quentin, r. Somme; cotton manufacture.

Loire; silk manufacture: noted for its beautiful promenades esorted to by the English.

. Seine.

, in the vicinity of Paris; magnificent palace, built by Louis unrivalled water-works.

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rait of Dover; the gate of France: taken by Edward III., ', after a protracted siege, and retained by the English for ıan two centuries. Pop. 12,000.

COLONIAL POSSESSIONS.

olonies of France consist of the islands of Mar- and Guadaloupe; Cayenne, and the eastern por- Guiana, in South America; Pondicherry, in the dies; Algiers, and other settlements, in Barbary; Louis, at the mouth of the Senegal; the island e, off Cape Verd; the island of Bourbon, in the Ocean; and the Marquēsas group in the Pacific.

POPULATION.

ırds of 34 millions; nearly 160 to a square mile.

CHARACTER.

French are remarkable for their vivacity, im- y, and fickleness; they are fond of amusement w; the external marks of politeness and good s may be traced through every rank of society.

ce has produced many men of great talents and , but the larger portion of the lower orders are uninstructed. It has 26 universities.

GOVERNMENT.

government is a limited monarchy. Females are d from the throne.

are two houses of legislature, the Chamber of Peers and the of Deputies, corresponding to the British houses of lords and . The king has the prerogative of proposing all laws in ıses, but the consent of the two chambers is necessary to proposition into effect.

The present king is Louis Philippe, who was raised to the throne by the revolution of 1830.

RELIGION.

As a state, France patronizes no religion in particular, but gives subsistence to the clergy of every denomination: the great majority of the people are Roman Catholics; the Protestants amount to about two millions.

The latter have at various times suffered severely; at the massacre of St. Bartholomew's day, on the 24th of August, 1572, ninety thousand were slain. By the revocation of the edict of Nantes, by Louis XIV. in 1685, 500,000 of the best citizens of France were driven into exile, carrying with them to Britain and other countries the arts and manufactures of their native country.

ANIMALS.

The domestic animals of France are generally inferior to those of England. Of wild beasts, the wolf and the lynx are occasionally met with; the ibex and chamois are found on the borders of the Alps and Pyrenees.

ANCIENT NAME.

Gallia; which was originally divided amongst three great nations, the Celtæ, Belgæ, and Aquitani.

HOLLAND.

BOUNDARIES.

N. and W. by the German Ocean; E. by Hanover and Rhine Prussia; and S. by Belgium.

SITUATION.

Between 51° and 53½° N. lat., and 3° and 7° E. long. Its length is 170 miles, and breadth 120.

COAST.

The general appearance of the coast bespeaks a *contest carried on* between the land and the ocean. The circular e of islands on the north, of which the largest is Texel, bably marks the ancient coast line of the continent.

MOUNTAINS.

Holland is a flat country absolutely destitute of moun-
ns, scarcely in any place rising above the level of the
an, and for the most part sinking 30 or 40 feet below
h-water mark. The sea is kept out by immense em-
nkments, which are sometimes broken down by the
lence of the waters.

GULFS, LAKES, ETC.

The Zuyder Zee (i. e. Sea of the South) stretches to the
ntre of the kingdom: Haarlem Meer communicates
th it by the channel of Y. Dollart Bay is between
oningen and Germany; and the Bies Bosch is in the
ighbourhood of Dort.

All these have been formed by irruptions of the sea, in compara-
ely modern times. The Bies Bosch was caused in 1421, by the rup-
e of several dykes, when 72 villages and a population of 100,000
ls were submerged.

RIVERS.

The Rhine and the Meuse terminate their course in
lland, but owing to the level nature of the country
ich they traverse, they divide into numerous sluggish
eams, that frequently interlace each other, and seem to
n the sea with difficulty.

s soon as the Rhine enters Holland it divides, the great mass of
waters going under the name of the Waal to Dort; the river which
ins the name of Rhine soon sends off another branch, the Yssel, to
Zuyder Zee. Yet again it divides, the greater part of the remain-
portion of waters going to the sea near Rotterdam, under the
omination of the Lech. The Rhine itself passes Utrecht and
s, a diminished stream, into the ocean near Leyden. The Meuse
s from the northern acclivity of the Vosges in France, near the
rce of the Soane, leaves the French territory at Charlemont, passes
Belgian towns of Namur and Liege, enters Holland at Maestricht,
pursues a circuitous course to the sea. Its mouths are mingled
h those of the Lech and Waal.

CANALS.

Holland is intersected with innumerable canals; they may be compared, in number and size, to the public roads in England. A prodigious inland trade is carried on by them between Holland and every part of France, Flanders and Germany. When they are frozen, the inhabitants travel on them with skates, and goods are carried in carts or sledges.

CLIMATE.

Holland is reckoned one of the most unhealthy countries in Europe. It is subject to frequent fogs and marshy exhalations, so that cold and moisture are the prevailing characteristics of the climate. In winter the frost is sometimes so severe, as to freeze not only the lakes and rivers, but also the Zuyder Zee.

TRADE AND COMMERCE.

During the 17th century the foreign commerce and navigation of Holland was greater than that of all Europe besides. By the rivalry of other nations it has lost its pre-eminence, but its trade is still great. Its principal imports are sugar, coffee, spices, &c., wine and brandy, grain, timber, and other Baltic produce. From England it imports hardware, tin-plate, rock-salt, and printed cottons. The exports consist, 1st, of native produce, as cheese, butter, madder, flax, linseed, &c.; 2dly, of the produce of her colonies in the East and West Indies; and, 3dly, of the produce of the extensive regions through which the Rhine and Meuse flow, of which Holland is the natural emporium.

Agriculture and gardening are brought to great perfection in Holland; the moisture of the climate greatly promotes the verdure of its pastures. The culture of ornamental plants, especially of the tulip and hyacinth, is carried to a great length.

PROVINCES.

ıingen, Friesland, Overyssel, Drenthe, Gelderland,
t, Holland Proper, Zealand, North Brabant, part
ɔurg, and part of Luxemburg.

CHIEF TOWNS.

ım, the capital of Holland, on the Y, is intersected by the
river Amstel. Originally a small fishing village, it is now
ond commercial city in Europe: it was built on piles, and is
d in the midst of a marsh: by means of a canal to Helder,
having communication with Amsterdam avoid the dangerous
tion of the Zuyder Zee: the city is surrounded on the inland
forts and ramparts, and by means of sluices the surrounding
y can easily be inundated: a multitude of canals intersect the
forming it into 90 islands. Pop. 220,000.
fine city; the usual residence of the court, and the place
the States General assemble. Pop. 58,000.
m, on an arm of the Meuse, (more properly the Lech,) where
all river Rotter enters it; the second city in importance in
ıgdom: the birth-place of Erasmus. Pop. 78,000.
on the Rhine; the seat of an university.
formerly celebrated for its university, and its trade in books.
Dordrecht); it chiefly trades in timber, which is floated down
ine in immense rafts: the synod assembled here in 1618 and
which condemned the doctrines of Arminius.
p-Zoom, communicating with the Scheldt, is an important
ı.
tween Rotterdam and Leyden, was long noted for its earthen-
the birth-place of Grotius.
n, is the most important city in the north: an university.
town in North Holland, remarkable for its cleanliness.
a beautiful city; as in the other large cities of Holland
planted on each side with trees, run along the principal
: an organ in one of its churches is much celebrated.
ırg, in the Dutch portion of the duchy of that name; a very
city.

COLONIAL POSSESSIONS.

forms the most valuable of the Dutch colonies;
ast they also possess the Moluccas, Bencoolen on
st of Sumatra, Macassar, and the eastern coast of
ı, Banda, &c. They have several forts on the Gold

Coast in Africa; and in the West Indies the islands of Curaçoa and Eustatia, Saba, and part of St. Martin; and on the continent of South America they are masters of Dutch Surinam. The most valuable portion of Surinam, comprehending the districts of Demerara, Berbice, and Essequibo, were ceded to the British in 1814.

POPULATION.

Holland contains about three millions of inhabitants.

CHARACTER.

The Dutch are proverbial for their industry and economy. They are dull and phlegmatic, and are rarely affected by violent passions. There is less depravity amongst the lower orders in Holland than in most other parts of Europe, and there are few among them that are wholly uneducated.

GOVERNMENT.

Holland and Belgium were long in the power of Spain; the persecution of the Reformers by Philip II. excited the Dutch to a revolt. The seven United Provinces achieved their freedom, after an arduous struggle, in 1648, and were acknowledged as an independent state. Napoleon, in 1810, made both Belgium and Holland a part of his immense empire. On the overthrow of that conqueror these countries were formed into one independent kingdom, under the name of the Netherlands; but in consequence of the revolution of August, 1830, the Belgic provinces have once more been severed from Holland.

The government of Holland is a limited monarchy. The States General, which consist of an upper and lower chamber, share the legislative power with the king. Trial by jury has not yet been adopted. The present king is William II.

RELIGION.

The Calvinist, or Reformed Church of Holland, is that to which the reigning family and the majority of the people are attached, but perfect toleration is allowed, and the ministers of all sects are paid by the government.

ANIMALS.

The stork is very common in Holland, and generally builds its nest on the tops of the houses.

ANCIENT NAME.

Batavia; so called from its being possessed by the Batavi, a Belgic tribe which supplanted the Celts, the original inhabitants.

BELGIUM.

BOUNDARIES.

N. by Holland.—E. by Rhine Prussia.—S. by France. —W. by the North Sea.

EXTENT.

Between 49½° and 51½° N. lat., and 2½° and 6° E. long.

RIVERS.

Belgium in its physical features resembles Holland. The Schelde rising on the borders of France, passes Ghent, where it receives the Lis; before reaching Antwerp it is enlarged by the Dender and by the Ruper, which is formed of the Senne and the Dyle; below Fort Lillo it divides into two estuaries, the East and West Schelde, which form the islands (in the Dutch territory) of Beveland, Walcheren, &c.

CANALS AND RAILWAYS.

Numerous canals, in addition to navigable rivers, give great advantages to the industry and commerce of the country. Belgium was the first state in Europe to plan and execute, at the public cost, a general system of railways. Taking Mechlin as the centre of the system, one line extends northwards to Antwerp, another eastward to Louvain, Liege, Verviers and the frontiers of Prussia, whence it is continued by a private company to Cologne; a southern line passes Brussels, Mons and

Valenciennes, and a fourth takes a western course to Ghent, where it divides, one branch going by Bruges to Ostend, the other by Courtray to Lille.

CLIMATE.

The climate is moist, the winters are cold.

PRODUCE, MANUFACTURES, ETC.

The soil is well cultivated, and grain is raised in quantities more than sufficient for the supply of the inhabitants. The Flemish horses, though too sluggish for the saddle, are admirably fitted for draught. Coal is very abundant, and is exported in large quantities, chiefly to France; mines of iron are numerous, and copper and lead are found in several of the provinces. Excellent marble and millstones are supplied in abundance. The woollen and linen manufacture is carried on briskly in many places, and in Ghent the cotton. The laces of Brussels and Mechlin retain their celebrity. The foreign trade is centred in Antwerp.

PROVINCES.

Limburg, Antwerp, East Flanders, West Flanders, Hainault, South Brabant, Namur, Liege, and part of Luxemburg.

TOWNS.

Brussels, the capital, on the Senne; noted for its lace and carpets: here Charles V. abdicated his throne in 1555: the field of Waterloo is twelve miles to the south; a large mound of earth, surmounted with a lion cast in metal, marks the spot. Pop. 100,000.

Antwerp is strongly fortified on the land side; its cathedral is the glory of the Low Countries: it has a good foreign trade, and its inland is promoted by its connection with Mechlin, Louvain, and Brussels by canals, and with Ghent by the Schelde; it exports flax and bark to Great Britain: birth-place of Rubens and Vandyke. Pop. 75,000.

Ghent, a city fifteen miles in circuit, but a great part is occupied by gardens and fields; it was from Ghent that the woollen manufacture was introduced into England, in the reign of Edward III., whose son, John of Gaunt, was born here: a canal to Bruges: university. *Pop. 84,000.*

, on the Meuse; coal and iron works, fire-arms; Spa, celebrated
its mineral waters, is to the west of Liege.

lin, (*French*, Malines,) on the Dyle; lace and linen.

, in Hainault, a strong fortress; coal mines.

es, in West Flanders, once a city of great trade; the spire of its
hedral may be seen from the mouth of the Thames: the art of
ting diamonds invented here.

d, a sea-port of declining importance. Steam packets to London.

r, at the confluence of the Meuse and Sambre; marble, cutlery,
ther, &c.

POPULATION.

pwards of four millions.

MANNERS AND RELIGION.

he character of the Belgians resembles that of the
h, but partakes of the gaiety of their southern neigh-
s. The Catholic religion is almost universally pro-
d, but the ministers of other denominations are sup-
ed by the state.

GOVERNMENT.

e Netherlands remained a part of the Spanish monarchy till the
ning of the 18th century, it then became the possession of Austria,
hom it remained till conquered by the French in 1794 and 1795.
ow for the first time a separate and independent kingdom.

government is a constitutional monarchy, consisting
hereditary king, a senate, and a chamber of deputies.
senate is elected for eight years and the chamber for
. Its present monarch is Leopold of Saxe Coburg.

ANCIENT NAME.

he present kingdom of Belgium occupies a large part
e Gallia Belgica of Cæsar.

SWITZERLAND.

BOUNDARIES.

. by Germany.—E. by Austria.—S. by Italy.—W.
rance.

EXTENT.

Between 46° and 48° N. lat., and 6° and 10½° E Length 200 miles, breadth 130; contains 19,000 s

FACE OF THE COUNTRY.

This is the most mountainous country in Europ Alps stretching over a considerable part of it. contains several lakes, as Constance, Geneva, Neuf Zurich, and Lucerne. It gives rise to two of the g rivers in Europe, the Rhine and the Rhone.

There are various passes between the highest elevations of th mountains, as the Great St. Bernard, by which Hannibal is s to have entered Italy; the Little St. Bernard; and the pa Simplon, which is 6,574 feet high, but which Napoleon conve a carriage-road. The height of perpetual congelation on th about 9,000 feet in summer, in winter it is of course lower. teration of the snow line causes the glaciers, which are describ sembling a stormy sea suddenly congealed. These immense r snow and ice are sometimes detached from their beds and carr ation with them. The falling glaciers are termed avalanches.

CLIMATE.

The various parts of this country, according t elevation, exhibit all the changes of climate from th to the southern parts of the temperate zone. T native plants of Greenland and Lapland are found g not far distant from those of Italy and Spain.

PRODUCTIONS, ETC.

The valleys and lower parts of the mountains i zerland are remarkably fertile; vineyards are co and fruits of the choicest kinds come to perfection country in general is naturally barren, yet persever dustry has done much for it. Pasturage is the chief of the farmer.

PROVINCES.

Switzerland is divided into 22 cantons, the most sive of which are Grisons, Bern, Valais, Vaud, Zurich, St. Gaul and Lucerne.

TOWNS.

the western extremity of Lake Geneva, is the most import-
n in Switzerland; and is noted for watch-making: Calvin
here. Population 26,000.

the Aar: birth-place of Haller. The armour of Tell is pre-
n the arsenal. Population 21,000.

. Bahl,) on the Rhine; a commercial town: paper said to
en invented here. Euler and Holbein born here.

the head of Lake Zurich; has flourishing manufactures of
cottons and silk handkerchiefs.

he capital of the canton of that name.

near Lake Geneva: here Gibbon long resided.

n this town the tyrant Gesler, the Austrian governor, placed
his hat upon a pole, with orders that the inhabitants should
same deference to it as to himself; this so enraged the people,
ler the celebrated William Tell, they threw off the Austrian
nd laid the foundation of the liberties of Switzerland.

POPULATION.

millions and a quarter, nearly.

CHARACTER.

Swiss have long been distinguished for their
steadiness and bravery; and above all, for their
ent to the liberties of their country. Every man
d a soldier, and when not required at home may
the service of foreign nations.

erman language is general in those parts border-
Germany, whilst French and Italian are spoken
onfines of France and Italy.

GOVERNMENT AND RELIGION.

land, originally divided into a number of independent lord-
came eventually attached to the crown of Austria. In 1308
he cantons threw off the yoke, and united together for mu-
ce; they were shortly after joined by others. In the present
me confederation subsists.

state governs its own internal affairs; but the ge-
usiness of the Union is managed by a diet con-
of representatives chosen from each canton. The
ets by turns in Zurich, Bern and Lucerne; each

of these towns is for successive periods of two years capital of the Confederation.

The majority of the Swiss are Protestants, but the Roman Catholics form a large and increasing minority.

GERMANY IN GENERAL.

Germany is not one country, but a confederation of several, which at a very early period united together for mutual defence.

Germany occupies the centre of Europe, from the Baltic to the Gulf of Venice*, and from France to Russia.

MOUNTAINS, ETC.

The Hercynian and Carpathian mountains run through the centre of Germany, and separate the streams which run into the Baltic from those that run into the Black Sea. The country to the north of this range gradually inclines to the Baltic, and is in general flat; it contains extensive sandy plains and marshy districts. The country to the south is more diversified and more mountainous.

RIVERS.

Germany is watered by numerous rivers, as the Danube, Rhine, Elbe, Weser, Ems, and Oder.

The Danube, after leaving Baden, in which it rises, crosses Wirtemburg; at Ulm it enters Bavaria, where it receives from the south the Lech, which passes Augsburg, and the Iser, which passes Munich; rolling on to Passau it receives the Inn from Switzerland, and enters Austria Proper. After watering Vienna and Presburg it passes Buda; before reaching the Turkish frontier, which it does at Belgrade, it receives three large rivers, the Drave, the Theiss, and the Save.

The Rhine, in its passage through Western Germany, receives the Neckar at Manheim, the Maine (which passes Frankfort) at Mentz, and the Moselle at Coblentz.

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* Hungary, Bohemia, Lombardy, &c., do not strictly form part of Germany, but as they virtually belong to Austria, it will confuse the subject less to consider them along with that empire.

e Elbe, before leaving the kingdom of Bohemia, in which it receives the river Moldau; it then crosses Saxony, watering its l, Dresden; next it traverses part of the Prussian territory, ing Magdeburg. The principal rivers which it receives in this f its course are the Saale, which washes Halle, and the Havel, passes Potsdam and Brandenburg. In the last part of its course lbe is the boundary between Hanover on the south, and the ies of Holstein and Mecklenburg on the north. It joins the t Cuxhaven, about 70 miles below Hamburg. The Elbe may vigated, in lighters, as far as the confluence of the Moldau. Its is much encumbered by shoals and sandbanks.

e Oder is now wholly a Prussian river.

e Weser, situated midway between the Elbe and Rhine, runs pa- to them; passing Minden, it falls into the German Ocean.

e Ems runs past Munster and Embden.

CLIMATE.

he extent of its latitude and the diversity of its eleva- cause a considerable variety in the climate of its ous regions. The northern part is exposed to the ls from the North Sea and Baltic, which render the ate moist and variable. The middle is, from its ele- n, colder than its latitude would indicate, but it is ected by the Hercynian and Carpathian chains from lasts of the north; the seasons are regular, and in valleys the summer's heat is powerful, and the vine ishes. The lofty heights of the Alps bring into con- ty, in the southern territories of Austria, the regions ernal snow, and of the vine, fig-tree, and olive.

PRODUCTIONS.

ermany is rich in minerals; the mountains between emia and Saxony are peculiarly so, they contain the est silver mines in Europe, tin mines scarcely inferior ose of Cornwall, and mines of copper, lead, iron, &c. region chiefly furnishes Europe with arsenic and lt. The quicksilver mines of Idria (north of Trieste) he richest in Europe, excepting those of Almaden in n. Rock-salt is abundant in various places. The topaz of Saxony, and the garnet of Bohemia valued. The opal is peculiar to Hungary.

The forests of Germany are of great exten an important article of export. The oak abc central regions ; the firs, which are not so ha as those of northern Europe, follow the co rivers.

The art of agriculture in Germany, especi south, is in a very imperfect state ; yet a larg of grain is raised than is required for home cc Hemp and flax are generally cultivated. T Tokay, and of the Moselle and the Rhine are Numerous herds of cattle form part of the ric many. The hog of Westphalia is much estee

COMMERCE.

Germany has few sea-ports, but its rivers gr tate commerce. Its numerous territorial div exacting duties on the passage of commoditi stricted its internal trade ; a recent commer amongst the several states has entirely re barrier. The exports consist chiefly of nati particularly corn, timber, and wool. Besid goods, it imports cotton, hardware, and othe tured articles from Britain. The staple man Germany is linen, of which much is exported: and cotton manufactures are inadequate to t mand. German porcelain is celebrated ; pap glass, and hardware are made, and much i displayed in fabricating various small works glass, wood, and ivory.

STATES.

The states of the Germanic confederacy have been div classes, according to their territorial extent and importanc

The first class consists of the kingdoms of Austria, Pr Saxony, Hanover, and Wirtemburg.

e second class contains the grand duchies of Baden, Hesse-stadt, and Luxemburg, and the electorate of Hesse-Cassel.

third class comprehends Brunswick, Mecklenburg-Schwerin, assau.

most important of the fourth class, which in all contains twenty-ates, are Saxe-Weimar, Saxe-Gotha, Saxe-Coburg, Saxe-Mein- Mecklenburg-Strelitz, and the free cities Hamburgh, Bremen, fort, and Lubeck.

POPULATION.

irty-nine millions; exclusive of those provinces of ria and Prussia which are not included in the German deracy.

CHARACTER.

e Germans are regarded as a frank and hospitable le, and are in general both sincere and faithful. The r orders are much attached to titles and show, and e extremely fond of music. They are sluggish and ; yet persevering industry, which has been carried great extent in the mechanical arts, is a decided trait e national character.

GOVERNMENT, RELIGION, AND LITERATURE.

e affairs of the Germanic confederacy are managed e Diet, which is formed by plenipotentiaries from ifferent states, and meets at Frankfort on the Maine. Diet has a right, as a collective power, to declare to make peace, and to contract alliances. Each state lependent as respects internal legislation.

Emperor of Austria no longer bears the title of Emperor of any; but the extent of his dominions gives him a decided pre-rance in the Diet; indeed the affairs of Germany may be said almost entirely at the disposal of Austria and Prussia.

e Reformation early made good progress in Ger-; it began at Wittenberg, a city of Prussian Saxony, e university at which place Luther was a professor ilosophy. The Protestant religion is the most pre-t in the north; the Roman Catholic in the south. ature is much cultivated in Germany; it has upwards venty universities. In Germany, where the art of *ing had its rise, the* press is peculiarly prolific.

Henne Gænsfleisch, commonly called John Gutenburg, a nativ Mentz, in the Duchy of Hesse, was the inventor of this wonderful The first printed book, the Latin Bible, was produced at Mentz, tween the years 1450 and 1455.

ANIMALS.

The bison is numerous in the Carpathian forests; bear, the wolf, the lynx, the chamois, and marmot also common, nor is the beaver entirely unknown.

ANCIENT NAME.

This country was anciently called Germania.

The Latin denomination of the country which we have adop supposed to be derived from the Roman manner of pronouncin word Wehrmann, which signifies soldier, the character in whic Germans were mostly known to the Romans. The Germans call country Deutschland, the French call it Allemagne.

AUSTRIA.

BOUNDARIES.

N. by Russian Poland, Prussia, and Saxony.—E Russia and Turkey.—S. by Turkey and the Gul Venice.—W. by Bavaria, Switzerland, and Sardinia.

EXTENT.

From 42° to 51° N. lat., and from 8° to 26° E. Length 800 miles, breadth 400, and contains a 258,000 square miles.

The empire of Austria comprehends nearly one-twelfth of the surface of Europe, ranking third amongst the countries of Euro extent of territory. It is a compact country, and well defend natural boundaries. Its most exposed frontier is on the N.E. possession of Dalmatia and Venice gives it a coast line on the A of 600 miles.

PROVINCES.

The component parts of the empire are:—Six countries, b each the name of kingdom, viz. Hungary, Bohemia, Galicia, Lom and Venice, Illyria and Dalmatia; one archduchy, Austria; one cipality, Transylvania; one duchy, Styria; one margraviate, Mo and one county, Tyrol.

TOWNS.

Vienna, the capital of the empire, on the Danube, where the small river Vien falls into it; its manufactures are considerable. It was taken by the French in 1806 and 1809. Pop. 358,000.

Prague, on the Moldau, the capital of Bohemia; an ancient university. Huss and Jerome, the precursors of the Reformation in Germany, resided here. Tycho Brahe died at Prague in 1601. Pop. 120,000.

Pesth and Buda, two towns separated by the Danube, but connected by a bridge of boats 300 yards long; Buda is the capital of Hungary.

Presburg, on the Danube, formerly the capital of Hungary, and here the Diet still meets and the kings are crowned.

Lemberg, the capital of Galicia or Austrian Poland; a place of great trade: the Jews, who are very numerous here, as in other parts of Poland, possess a synagogue capable of holding 10,000 persons.

Trieste, at the head of the Gulf of Venice, is the principal sea-port of the Austrian dominions.

Venice; the earliest, and long the most flourishing sea-port of Europe.

Brunn, in Moravia; woollen manufactures: it has been denominated the Leeds of Austria.

Debretzin, in the east of Hungary; Schemnitz, in the mining district in the north-west of that country; Szegedin, at the confluence of the Maros with the Theiss; and Gratz, the capital of Styria, are towns of some importance.

Toplitz, in Bohemia, is celebrated for its hot springs.

Mantua, the birth-place of Virgil; Verona, noted for its ancient amphitheatre; Padua, the seat of a university, and the birth-place of Livy; and Trent, in which the celebrated ecclesiastical council was held between 1545 and 1563, are in the Austrian territories in Italy.

POPULATION.

The people are chiefly composed of three races—Slavonians, Germans and Italians. The whole population amounts to thirty-six millions.

GOVERNMENT, ETC.

In all the provinces except Hungary and Transylvania the emperor possesses absolute authority. The present emperor is Ferdinand, who being incapacitated for his high duties by mental and bodily weakness, the government is managed by a council, at the head of which is his brother and heir presumptive, the Archduke Francis.

The Roman Catholic is the established religion professed by the great majority of the populatio to it is the Greek Church. Calvinism and Lutl are professed by considerable numbers of peop creeds are tolerated.

ANCIENT NAME.

The present empire comprehends the ancient Vindelicia and Noricum, with portions of Il Pannonia, Sarmatia, Germania, Rhætia, and Itali

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PRUSSIA.

BOUNDARIES.

N. by the Baltic.—E. by Russia.—S. by Au Saxony.—W. by Mecklenburg and Hanover.

An extensive district on the Rhine also form this kingdom, and is called Rhine Prussia. T of Rugen, separated from the main-land by a s mile broad, belongs to Prussia.

EXTENT.

It extends from 49° to 56° N. lat., and f (including Rhine Prussia 6°) to 23° E. long., and in all about 108,000 square miles.

PLAINS, LAKES, AND RIVERS.

The eastern part of Prussia is an almost uninte plain, the western is diversified with some hills; part can be called mountainous except Silesia, i is an extension of the Carpathian chain, called the mountains. Near the Baltic the country is so f the rivers, before entering the sea, spread out int stagnant lakes; the largest of these are the Curisc Frische Haff, and Gross (Great) Haff. Dykes are parts necessary to protect the land from the encroa of the sea. The principal rivers of Prussia are th the Vistula, the Pregel, and the Niemen.

he Oder rises in the mountains of Moravia, passes Breslau, Glogau,
Frankfort on the Oder; at Kustrin it receives the Wartha from
and, and below Stettin it expands into the Gross Haff.

he Vistula or Weichsel rises on the borders of Galicia; it crosses
and, watering Warsaw, and enters Prussia near to Thorn. On
roaching the sea it divides into three branches, the largest of which
s the Gulf of Dantzic, the others enter the Frische Haff.

he Pregel, at Konigsberg, also joins the Frische Haff, the accumu-
d waters of which gain an exit to the sea at Pillau.

he Niemen or Memel river rises in Russian Poland, passes Grodno,
wno, and Tilsit, and after forming the Curische Haff, enters the sea
emel.

he waters of the Spree, on which Berlin stands, run into the Havel,
ch river joins the Elbe.

CANALS.

canal unites Magdeburg with Berlin, another joins the Spree to
Oder, and another connects the Vistula with the Netz (a feeder of
Warta). Thus, while Prussia is traversed across its breadth by its
cipal rivers, it is cut longitudinally by their branches or by canals.

CLIMATE.

The climate is for the most part moist and cold, and
forests and marshes, in many places, render it un-
althy. Silesia is the most pleasant and healthy province.
ine Prussia enjoys a fertile soil and a genial climate.

PRODUCE, COMMERCE, ETC.

Prussia is not on the whole a fertile country, yet hemp
d flax are raised in abundance. Large quantities of
rn are exported, chiefly from Dantzic; but it is brought
wn the Vistula from Poland. Timber, the produce of
e banks of the Niemen, is largely exported from Memel.
mber, a substance almost peculiar to Prussia, is chiefly
und near Pillau; it is sometimes thrown on shore during
storm, but it is generally obtained in lumps from pits.
nen is the principal manufacture.

PROVINCES.

The provinces of Prussia may be divided into three divisions.—
, Those which belong to the German confederation, viz., Branden-
rg, Pomerania, Silesia, and Prussian Saxony.—2ndly, Those in the

east, which do not form part of Germany, viz., Prussia Proper and Po
—3rdly, Westphalia and Rhine Prussia.

TOWNS.

Berlin, r. Spree, the capital, is one of the best built cities in Euro
its cast-iron and porcelain goods are noted. Pop. 291,000.

Breslau, r. Oder, the capital of Silesia; its manufactures are
siderable: linen is the staple. Pop. 90,000.

Konigsberg, an important commercial city on the Pregel; Pillau is
port of Konigsberg, a bar upon the entrance of the Frische
preventing the approach of large vessels to the city.

Cologne, r. Rhine; the Colonia Agrippina of the Romans. Its vas
unfinished cathedral contains the shrines of the three kings or m

Dantzic, next to St. Petersburg, is the most important commercial
in the north of Europe: the export of wheat is greater than from
other port in the world.

Magdeburg, r. Elbe, a strongly fortified city of Prussian Saxo
woollen and silk manufactures.

Aix-la-Chapelle, is just within the western boundary of Prussia;
brated for its warm baths: the favourite residence of Charlema
the congress of European sovereigns held here in 1818.

Potsdam, near Berlin; the occasional residence of the court.

Stettin, on the Oder, 60 miles from the sea: enjoys from its situa
the commerce of Brandenburg and Silesia, as well as of Pomera
of which it is the capital.

Coblentz, is advantageously situated for trade, being connected
France by the Moselle, and with Germany, Switzerland, and
land by the Rhine; it is very strongly fortified.

Eisleben, in Prussian Saxony, the birth-place of Martin Luther.

Wittenburg, Prussian Saxony, intimately connected with the name
Luther and Melancthon and the history of the Reformation.

The other inland towns of some note are, Elberfield and Dusseld
in Rhine Prussia; Erfurt and Halle, in Prussian Saxony,
Thorn, in West Prussia, the birth-place of Copernicus.

The other sea-ports are Colberg, Memel, and Stralsund.

POPULATION.

It contains upwards of fourteen millions of inhabita

GOVERNMENT, RELIGION, AND LITERATURE.

The Prussian monarchy is little more than a century old, the nuc
of it was the dukedom of Brandenburg, which Frederick the Gr
Elector in 1656, compelled the king of Poland to declare an in
pendent state, and it was afterwards, in 1701, acknowledged as a kingd

The government is an absolute monarchy, the will of he sovereign not being controlled by any representation f the wishes of his subjects. All the young men are ompelled to serve for a certain period in the army. The resent king is Frederick William III.

The prevailing and established religion is the Protestnt, under the two denominations of Lutheran and Calinistic; but Roman Catholics are numerous, and all ects are tolerated.

Prussia has produced many men of science, and posesses four universities, Berlin, Halle, Konigsberg, and reslau; that of Berlin is much distinguished.

This is a well-educated country; by law a school is stablished in every village, and parents are subject to a enalty if they do not send their children to school.

ANCIENT NAME.

Prussia is contained within the limits of the ancient ermania, with the exception of East Prussia, which enroaches upon Sarmatia.

SECONDARY GERMAN STATES.

SAXONY.

Saxony is intersected by the Elbe, and its tributary, the ulda; it lies between Bohemia and Prussia.

Its climate is good, and the soil generally fertile; the nd is better cultivated than in most parts of Germany. ts minerals are valuable; the wool of Saxony, and of e neighbouring provinces, is much esteemed.

Most of the wool imported into Britain was, till recently, brought om Spain;—the Merino breed of sheep has been introduced into axony, and German wool is now imported into England, superior in ality, and much greater in quantity than the Spanish ever was.

owns.—Dresden is the capital of Saxony; it is a beautiful city, enjoying a good trade: the china called Dresden is not made here but at Meissen, 14 miles distant.

Leipsic, on the river Pleisse, a tributary of the Saale: its univer celebrated. It has the largest book-trade of any town on the nent: its fairs, held three times a year, are frequented by mer from all parts of the world: the French defeated here in 181

Freiburg, r. Mulde; noted for its silver mines and its mining aca

The government of Saxony is a limited monarch

The Prussian province of Saxony formerly formed part kingdom, but was severed from it by the Great Powers of Eur consequence of the king taking the side of Napoleon.

The Saxons are very industrious, and are perhap most enterprising people in Germany. It is their ambition to become a commercial people.

The prevailing religion is Lutheran; but the family are Roman Catholics.

The language of Saxony is considered to be the of the dialects of Germany.

BAVARIA.

Bavaria consists of two portions; the larger lies basins of the Danube and the Main, between Bohemi Wirtemburg, the smaller to the westward of the Rh

It comprises a territory of about 40,000 square and has a population of about five millions.

It is mountainous in the north and south; sever tensive plains occupy the centre; its climate is di fied, and its soil possesses various degrees of fertilit the finest districts are rudely cultivated, or suffer lie altogether untilled.

Towns.—Munich, the capital, r. Iser. Celebrated for its mag new palace, sculpture, and picture gallery. Pop. 107,000.

Augsburg, at the confluence of the Lech and Wertach. To th assembled here in 1530, was presented the celebrated confes Protestant faith drawn up by Luther and Melancthon.

Nuremburg; gunpowder said to have been invented and watch made here: it is still distinguished for the manufacture of clock-work, toys, &c. The famous painter Albert Durer bor

Ratisbon; the German Diet used to assemble here: the cel astronomer Kepler buried here.

Blenheim, the place of Marlborough's victory in 1704, is on t *nube, below* Ulm.

;overnment of Bavaria is monarchical; the pre- religion is Roman Catholic, under a discipline id than is found elsewhere in Germany.

HANOVER.

kingdom is chiefly situated in the basins of the l Weser, between Prussia and Holland.

:ains 14,000 square miles, with a population of of a million and a half.

er is a flat country; the part nearest the sea is ›ther portions consist of sandy and barren plains. le regions are not well cultivated. Its manufac- inconsiderable.

of the kingdom of Hanover is the city of the same name. sea-port is Embden. Gottingen is the seat of its only ', which at present is in a flourishing state.

litical constitution of Hanover resembles that of the crown is hereditary, but is restricted to the ; the present king is Ernest Augustus, Duke rland.

ınism is the established religion of Hanover, ete toleration is enjoyed.

WIRTEMBURG.

burg is situated in the S.W. of Germany. It is :incipally by the Danube and the Neckar.

is fertile, the high grounds are covered with the Black Forest mountains yield valuable ores.

ıtgard, the capital, is only inferior to Leipsic and Berlin in ade.

ed town on the Danube, has a considerable transit trade: :d in modern history for the capture of General Mack and f 30,000 Austrians, by Napoleon, in 1805.

ernment is a limited monarchy; the prevailing Lutheranism.

BADEN.

›nsists of a long narrow strip of country, embraced by the Rhine on its southern and western The general aspect of the country is mountaino Black Forest comprises one-third of it. Its numer add to its picturesque beauty. It is often denomi account of its romantic scenery, the paradise of (

Towns.—Carlsruhe (Charles's Rest) the capital of the state;

Baden-Baden, celebrated for its mineral waters, is frequent sands of strangers.

Freyburg; its cathedral is celebrated; S. E. of Freyburg is t thal (infernal valley) through which General Moreau e celebrated retreat in 1796.

OTHER GERMAN STATES AND FREE CITIES

Several other minor states are scattered ov many: most of them are of small extent, and fe population equal to that of second rate English t

There are four free cities; Frankfort on the Hamburg, Bremen, and Lubeck. These cities pendent of the surrounding states, each having a government, of the republican form, and poss vote in the German Diet.

Hamburg, Bremen, and Lubeck, are Hanse tov

The Hanseatic league was an association of the principal c north of Europe for the protection of commerce; it arose in century, when every sea was infested with pirates. Before the thirteenth century 60 or 80 cities had joined the league, fleets and armies were too powerful for the neighbouring resist. The affairs of the league were managed by a congr met every three years, generally at Lubeck. From the mid fifteenth century it declined, when the civilization which it moted rendered its continuance unnecessary. The three tow are the only ones now in the league.

The chief commercial city of Germany, and pe the continent, is Hamburg, which was founded b lemagne in the ninth century. Its situation giv trade of the vast country traversed by the Elbe also communication, by means of a canal, with tl Trave, and consequently with Lubeck and the B

The immense trade of this city is chiefly in the hands of th and it is the grand inlet by which British manufactures find their way into some of the richest and most extensive European countries.

The government of Hamburgh is vested in a senate chosen by the citizens.

Hamburg owes its liberty to the mutual jealousy of its neighbours, the kings of Denmark and Prussia, neither of whom will consent to the other getting possession of so rich a prize, though both covet it.

The population of Hamburg is 128,000.

SPAIN.

BOUNDARIES.

N. by the Bay of Biscay and the Pyrenees.—E. and S. by the Mediterranean.—W. by Portugal and the Atlantic.

EXTENT.

It is situated between 36° and 43½° N. lat., and 9° W. and 3°. E. long. Its length is 600 miles, and breadth 500 ; it contains about 190,000 square miles.

CAPES, BAYS, AND ISLANDS.

The capes are, Cape Ortegal, the most northerly point; Cape Finisterre, the most westerly ; Cape Trafalgar, near Gibraltar; Cape Gata and Cape Palos, on the south-east; Cape St. Martin and St. Sebastian, on the east.

The bays are, Corunna, between capes Ortegal and Finisterre; the bay of Cadiz; the gulfs of Carthagena, Alicante, Valencia, and Tarragona.

The islands Majorca, Minorca, Iviza, Formentera, &c., off the eastern coast, belong to Spain,—the group is called the Balearic isles,—their ancient inhabitants were very expert in the use of the sling.

MOUNTAINS.

Next to Switzerland, Spain is the most mountainous country in Europe. The Pyrenees are continued in a chain denominated the Asturian or Santillanos mountains, along the northern coast.

The whole of the central part of the peninsul of an elevated plain, about 1800 feet high ; to this table land, between New Castile and Arag chains of mountains rise, which traverse the co east to west, in a direction nearly parallel to e These are, 1st, the Castilian mountains, whic tinued through Portugal, under the name o Estrella. 2nd, the Sierra de Toledo. 3d, Morena. 4th, the Sierra Nevada, or Snowy M

The summit of the mountain system of Spain is indic southern branches of the Ebro, the springs of the Ta and other rivers, running in different directions.

Mount Mulhacen, in the Nevada chain, is 11,700 feet hi

RIVERS.

Four great valleys are formed by these mount each having its corresponding channel, along water, falling between the ridges, escapes to The principal rivers are the Douro, the Tagus, diana, the Guadalquiver, which fall into the Atl the Ebro, which falls into the Mediterranean.

The Douro passes Toro and Zamora, crosses Portugal, a the sea at Oporto, after a course of 380 miles.

The Tagus rises on the borders of Aragon, it is soon i numerous tributaries, into one of which the r. Manzana which Madrid stands, runs ; it passes by Toledo, Alcantara, tarem, and after a course of about 500 miles, falls into the Lisbon, forming a capacious haven.

The Guadiana, flowing between the ranges of Toledo Morena, passes by Merida and Badajoz, whence, for som it separates Spain from Portugal ; before joining the sea it the boundary between the two countries.

The Gaudalquiver (properly *Wad 'el Kebir*, the great ri by Cordova and Seville, and falls into the Atlantic at St. L

The Ebro, the ancient Ibĕrus, rises in the province of from the southern flank of the Asturian chain ; fed by streams descending from the Pyrenees and the eastern decli central plain, it is soon the deepest and most rapid river in Spain; it passes Logrono, Tudela, Saragossa, and Tortosa, and falls into the Mediterranean after a course of about 400 miles. Shoals and rapids render this river of little use in navigation.

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* A Spanish word, signifying a saw,—a chain of mountai ing, at a distance, an appearance resembling a saw.

CLIMATE.

From the situation of Spain it would be one of the hottest countries in Europe, were it not for the extensive ridges of mountains and the great extent of sea-coast. The elevation of the central region renders that the coldest, whereas it would otherwise be the hottest, region; the orange tree flourishes in other places, but cannot bear the winter of this. The elevated provinces of the north are also exposed to severe cold. In the valleys of the south the heat is often excessive in summer, and the hot winds from the African deserts are sometimes painfully felt. The climate on the whole is salubrious.

The barometer at Madrid is usually two inches lower than at the level of the sea. Its mean annual temperature is 59° of Fahrenheit.

PRODUCE, MANUFACTURES, AND COMMERCE.

Spain is a country highly favoured by nature; the finest fruits grow spontaneously, most of the metals are abundant, and its situation, as well as the number of its ports, is peculiarly favourable to commerce. Its flocks of sheep, too, have always been noted for the fineness of their wool. Notwithstanding these advantages, the commerce of Spain has long been in a declining state. The chief articles of export are the wines of Xeres, (sherry,) brandy, oranges, raisins, and other dried fruits, olive oil, wool, oak, and cork bark, barilla, and quicksilver. The imports are colonial produce from Havannah and Porto Rico, hemp, flax, cotton, and other manufactured goods, dried fish, &c.

The Phœnicians, the Carthaginians, and the Romans resorted to Spain for its metals; the extensive excavations, which yet remain, testify the extent of the trade. Gold dust is still occasionally found in the sand of the rivers. The silver mines are but little wrought, in consequence of the superior richness of the Mexican ore.

Three-fourths of the foreign trade of this country is in the hands of smugglers; the excessive duty on the import of foreign manufactures amounting to a prohibition of them. Manchester goods are introduced in great quantities into Spain through Gibraltar.

PROVINCES.

The provinces on the Bay of Biscay are, Galicia, Asturias, Santander, and Biscay. On the French frontier, Navarre, Aragon, and Catalonia. On the Mediterranean, Valencia, Murcia, Andalusia. On the frontiers of Portugal, Estremadura and Leon. The inland provinces are New and Old Castile.

TOWNS.

Madrid, is situated on the r. Manzanares, in the midst of a sterile plain; it is the capital of the kingdom, but is without manufactures or commerce. Pop. 210,000.

Barcelona, the capital of Catalonia, on the Mediterranean, of great commercial importance during the middle ages. It has considerable manufactures, the chief is silk. Pop. 140,000.

Seville, a city of very remote antiquity, and once the capital of Spain; its cathedral is celebrated: its trade has declined, but is still extensive. Pop. 91,000.

Gran'ada; the stronghold of the Moors when in Spain, who have left behind them many relics of their magnificence.

Valencia, on the r. Guadalaviar, the capital of the province; paper-making and printing early introduced, and still carried on: silk manufactures: the province supplies most of Spain with rice.

Cādiz, the principal commercial city and sea-port of Spain; it is strongly fortified: one of the principal stations of the Spanish navy: its trade has been much diminished by the loss of the American colonies.

Saragossa, r. Ebro; capital of Aragon: celebrated for its two sieges in 1808 and 1809.

Malaga, Granada, on the Mediterranean; its almonds are most esteemed in the English market: also exports sweet wines, raisins, oil, &c.

Carthagena, built by Asdrŭbal; the best harbour on the Mediterranean.

Cordova, Andalusia, r. Guadalquiver; an ancient city: the birth-place of the Senecas and Lucan. Once famous for leather, called from the place, cordovan, and the workers of it cordwainers.

Gibraltar, on a rocky peninsula about 1,400 feet above the level of the sea: it was taken by the British in 1704, and it resisted from 1779 to 1783 the combined efforts of the French and Spanish fleets.

Toledo, New Castile, r. Tagus; the ecclesiastical metropolis of the country; it was once famous for its sword-blades.

Salamanca, a city of Leon; the chief seat of Spanish literature: the French defeated here in 1812.

on the Bay of Corunna; an important naval station.
stian; the only port of consequence on the northern coast; one
keys of Spain: taken by assault by the British in 1813.
, a sea-port in Gallicia, with considerable trade; here Sir John
defeated the French in 1809, and fell.

COLONIES.

olonies of Spain were once thirty times as extensive as the
ate; Mexico and a great part of South America belonged to
that it now retains are the isles of Cuba and Porto Rico, in the
dies; the Canary isles, off the coast of Africa; and the Phi-
nd Ladrone islands, in the Indian Archipelago.

POPULATION.

er more than twelve millions, which does not equal
England and Wales.

ot of the Spanish language is Latin, intermingled with Gothic
rish phrases. It contains more Latin words than the Italian
This is an indication of the extent to which the Romans, and
ls the Goths and Moors, overran the country and intermingled
Celts, who were the early inhabitants of the peninsula. From
es the present race of Spaniards springs.

CHARACTER, MANNERS, ETC.

Spaniards are remarkable for gravity of deport-
nd taciturnity, but are fond of gaiety and amuse-
they are proud, indolent, and bigoted; their pas-
re warm, yet they are generous, and capable of
attachment. They are very averse to the pur-
agriculture and commerce. Superstition and in-
ce have done much to debase a character which
s the germ of many excellencies.

arts and literature once flourished in Spain, but
so no longer. Spain is almost destitute of roads,
s not less unfavourable to civilization than it is
merce.

GOVERNMENT.

constitution of Spain is a limited monarchy,—it is
ent in a very unsettled state The clergy have

great influence, and are not amenable to the bunal. Isabella II. now holds the sceptre.

The Roman Catholic religion is universally The inquisition, which used to reign here in a rors, was abolished in 1820.

ANIMALS.

The Merino sheep are well known; the Span are esteemed for their spirit and the eleganc form. The asses and mules are much superic of other European countries, and are chiefly u velling in the mountain districts. Bears, ly wolves are met with on the skirts of the Pyrene

ANCIENT NAME.

Spain was known in ancient times by the na pania, Iberia, and Hesperia Ultima.

It was called Iberia from the river Iberus; and Hesp extreme western situation; the epithet *ultima* was added t it from Italy, which the Greeks named Hesperia, on ac western situation with respect to them.

PORTUGAL.

BOUNDARIES, EXTENT, CAPES, ETC.

It is bounded N. and E. by Spain.—S. and Atlantic. It lies between 37° and 42° N. lat., a 9½° W. long. Its length is 360 miles, its greate 140, and it contains 40,000 square miles.

The principal capes are Mondego, Roca, and cent. The natural geography of Portugal is that of Spain.

COMMERCE AND COLONIES.

Manufactures and agriculture are much ne Portugal; its commerce too is languid. Its article of export is port wine; Oporto is the se trade, which is in the hands of British merchant

Portugal took a distinguished part in the maritime enterprises of the 15th and 16th centuries,—and the acquisition of numerous valuable colonies rewarded her exertions. The chief of these, Brazil, has declared its independence; Portugal still retains Madeira, the Azore, and Cape Verd islands; with settlements in Guinea, Angola, and Mozambique, in Africa; Goa in India, and Macao, in China.

PROVINCES.

Portugal is divided into six provinces;—Entre Douro e Minho, Tras os Montes, Beira, Estremadura, Alentejo, and Algarve.

TOWNS.

Lisbon, on the Tagus, the capital of the kingdom; has an excellent harbour: its commerce is comparatively considerable. By the earthquake in 1755 the city was nearly destroyed, and 30,000 inhabitants were killed. Pop. 260,000.

Oporto, r. Douro; the second city in the kingdom. Pop. 70,000.

Coimbra, the ancient capital of the kingdom; an university.

Braga, one of the chief towns of the interior; see of an archbishop.

Setubal, or St. Ubes, a sea-port on a bay south of the Tagus; exports salt largely to Sweden and other countries.

POPULATION, GOVERNMENT, AND RELIGION.

The population is about 3,500,000.

The peasantry are, for the most part, in a state of vassalage. The influence of the clergy is great, though here, as in Spain, infidelity has to a large extent taken the place of superstition. Ecclesiastics, monasteries and nunneries superabound; a large portion of the best land is church property. The inquisition has succeeded, as in Spain, in repressing the profession of Protestantism.

The government is monarchical; Maria II. is queen.

ANCIENT NAME.

The Roman province of Lusitania nearly corresponds to the present kingdom of Portugal.

ITALY IN GENERAL.

BOUNDARIES.

N. by *the Alps which* separate it from Switzerland and

Austria.—E. by the Gulf of Venice.—S. by the M ranean.—W. by France and the Mediterranean.

COAST AND ISLANDS.

The peculiar shape of Italy gives it a great ex sea-coast. The most remarkable gulfs are, the (Trieste at the northern extremity of the Adriat Gulf of Manfredonia on the east, Taranto on the and Salerno, Naples, and Gen'oa on the west.

The capes are Gargano, Leuca, and Spartivento.

The islands of Sicily and Sardinia belong to the states; Corsica, which is separated from Sardinia Strait of Bonifacio, belongs to France. To the n Sicily lie the Lipari isles, the largest of which are Vulcano, and Stromboli; they are all of volcanic Malta, a place of great strength, is to the south of it is in the possession of the English. The isle o between Corsica and the main land, belongs to T

MOUNTAINS, LAKES, AND RIVERS.

The surface of Italy is extremely diversified wit and valleys, rivers, lakes, and mountains. On the are the Alps; and the Apennines run through nea whole extent from north-west to south-east.

Many of the lakes are peculiarly beautiful: the are Lago Maggiore, Como, and Garda, in the nort Bolsena and Fucino in the middle.

The largest rivers are the Po, Adige, Tiber, and

The Po, the Padus and Eridănus of antiquity, occupies a sive basin formed by the Alps and the Apennines. It has i s, the beds of the Po and the Adige are raised considerably above vel of the surrounding country, and the rivers are kept in by em- ients. From a similar cause, the land at the mouth of the Po is ually encroaching on the sea. The ancient port of Adria, which iame to the Adriatic Sea, is now 18 miles from the coast.

Tiber rises in the Apennines, on the confines of Tuscany, passes rugia and Rome, and 14 miles below the latter city falls into the erranean Sea. The quantity of earthy matter brought down by 'iber gives it the tawny colour for which it was noted of old. the ancient port of Rome, is now some miles from the coast.

Arno flows by Florence and Pisa.

CLIMATE.

ie climate of Italy is various. The perpetual snows e Alps have an influence upon the northern region, sting of the basin of the Po; here the climate is gene- serene and temperate, but the winters are some- severe. The second region, comprehending Tus- and the Papal State, is not exposed to much cold inter, but throughout the whole of its western coast, iding in some places 40 miles inland, a peculiar of the atmosphere, denominated *malaria*, productive e most malignant fevers, prevails during summer and nn. In the southern region, the thermometer seldom to the freezing point in the low grounds, and the ex- ve heat of summer renders the winter's snow of the nnines, which is stored away in great abundance, an e of the greatest luxury. This region is usually t Easter visited by the Sirocco wind, which blows the south; it is injurious to vegetation, and pro- in man an extraordinary degree of lassitude and ity. The Apennines running through the whole of , considerably lessen, in all the regions, the violence e heat in summer, and during the sultry season a e usually sets in from the sea in the morning, con- ig till the afternoon.

PRODUCE, MANUFACTURES, AND COMMERCE.

ie basin of the Po is peculiarly fertile, and grain is raised in abundance: the middle region is devoted to pasturage; in the south the system of agriculture is excessively rude, but the soil is fertile, and the vine, the fig, and the olive tree flourish almost spontaneously; oranges are very abundant; mulberry trees are cultivated in such numbers as to render silk one of the staple productions of the country; rice is produced in small quantities, and the sugar cane and cotton plant flourish. Quarries of beautiful marble and other valuable minerals are found in the Apennines; the white marble of Carrara is in great request for statuary purposes. Manufactures and commerce are at a low ebb; the chief exports are raw and manufactured silks, olive oil, fruits, shumac, valonia, with rags, sulphur, &c. The imports are exceedingly numerous, and comprehend all sorts of articles, with the exception of those produced in Italy.

Next to Germany, Italy is the largest European importer of English goods. Articles to the amount of a million and a half pounds sterling have been sent direct to Italy in one year. They consist chiefly of cotton goods, refined sugar, woollens, iron, steel, and hardware, linens, fish, earthenware, &c. A large portion of the Italian silk brought to Britain does not come direct, but being sent by the Languedoc canal to Bordeaux is re-exported to Britain. Gallipoli, on the Gulf of Taranto, furnishes Britain with the largest supplies of olive oil.

POPULATION, MANNERS, AND RELIGION.

The population of Italy is estimated at twenty millions. The manners of the modern Italians are those of a degenerate and humiliated people; complimentary, artificial, wary, and distrustful, and little bound by moral principle, yet amiable and gentle in the common intercourse of society. They are famous for their skill in music.

The government varies in different states. Naples and Sicily are governed by a king. The middle part is under the dominion of the Pope; the northern is divided into a number of states. The religion is Roman Catholic.

ANCIENT NAME.

Italy was called Hesperia by the Greeks; it bore also at different periods, the appellations of Saturnia, Ausonia, and Œnotria: but about the time of Augustus the name Italia, which originally denoted the southern part of the peninsula only, superseded the rest.

Italy was divided by the Romans into three parts, Italia Gallica extending from the Alps to the Rubicon and Arno; Italia Propria, reaching to the south of Naples; the remaining part was called Magna Græcia, from the number and fame of its Greek colonies.

ITALIAN STATES.

Italy, which has twice reigned over the world, once as a political, and latterly as a spiritual lord, is now broken into several states. Besides the Lombardo-Venetian kingdom, which forms part of the Austrian empire, it contains the kingdom of Sardinia, the duchies of Parma, Modena, and Lucca, the grand duchy of Tuscany, the State of the Church, the republic of San Marino, and the kingdom of the Two Sicilies.

I. THE KINGDOM OF SARDINIA.

The kingdom of Sardinia comprises the island of Sardinia, and the continental territories of Savoy, Piedmont, Nice, and Genoa in the north-west part of Italy.

The island of Sardinia is about 160 miles long and 90 broad, it is naturally fertile, and was considered one of the Roman granaries. The Carthaginians drew considerable produce from its silver mines,—these are now exhausted, but those of iron and lead are said to be valuable. The inhabitants are ignorant, and rude in dress and manners. The Waldenses, a noble army of martyrs, who in the darkest ages stood firmly by the truth, inhabited the valleys of Piedmont, near the source of the Po.

The principal towns in Sardinia are,—

Turin, the capital, on the r. Po, which is navigable here. Pop. 114,000.

Gen'oa, on the Gulf of Genoa; it is a fine city, fortified on the land side with a double wall; its appearance from the sea is magnificent: its commerce is considerable. Pop. 80,000.

Cagliari, (*pro. Calyaw'ree,*) the capital of the Island of Sardinia.

The government is monarchical; the crown is hereditary, but females are incapable of succession. The French language is very generally spoken at Turin.

II. DUCHY OF PARMA.

The Duchy of Parma lies south of the Po, between Sardinia and Modena.

Its chief town is Parma. The famous Parmesan cheese was originally made in the surrounding country, it is now chiefly made in the rich pastures between Mil'an and the Po, in Lombardy.

III. DUCHY OF MODENA.

Modena is situated a little to the south of the river Po, having Parma on the west, and the Papal State on the east. It has a population of 403,000.

Its chief towns are the capital of the same name and Reggio.

The government is despotic.

IV. DUCHY OF LUCCA.

Lucca is on the Mediterranean coast, between Modena and Tuscany. In size it is considerably smaller than the English county of Hertford. It is said to be the most populous and best cultivated part of Italy. Pop. 170,000.

Its towns are Lucca, the capital, and Viareggio, on the coast.

Most of the Italian image and plaster-cast makers, in other countries of Europe, are emigrants from Lucca.

The government is a limited monarchy.

V. GRAND DUCHY OF TUSCANY.

Tuscany has the Mediterranean on the west, and is nearly encircled by the State of the Church on its other sides. It possesses the isle of Elba.

Florence is the capital of Tuscany; it stands in a delightful valley intersected by the Arno. Its gallery contains many of the finest sculptures and paintings in existence. Dante, Petrarch, Galileo, M. Angelo, and Leo X., were born here. Pop. 98,000.

Leghorn, or Livorno, on the Mediterranean, has become the greatest commercial city in Italy, owing to the freedom and security which foreigners have long enjoyed. Leghorn platting for straw hats is the finest in the world. Pop. 76,000.

Pisa, on the Arno, near its mouth; a university; is remarkable for its leaning tower, which overhangs its base 15 feet.

The government is an unrestricted monarchy, but the Grand Duke has long exercised his power with mildness.

VI. THE STATE OF THE CHURCH.

The State of the Church is bounded by the Adriatic on the E., the Mediterranean on the W., having Tuscany on the N., and the kingdom of the Sicilies on the S.

The metropolis of the Papal State, and once of the civilized world, is **Rome**: it is on the Tiber, 14 miles from its mouth: the modern city is ill built: St. Peter's Church is the largest in the world: the Vatican, a palace of the Pope, is enriched with an immense library: the most perfect of the old Roman temples remaining is the Pantheon, originally dedicated to all the gods, now used as a church, and dedicated to all the saints: part of the Colisēum, or amphitheatre of Vespasian, remains; it held 80,000 persons. Pop. 160,000.

Bologna, is the second town in the Papal dominions; an university.

Ancōna, is the principal sea-port.

The government of this State is nominally a theocracy, the Pope, as the vicar or vicegerent of God, being invested with absolute power. The Pope is elected by the college of cardinals from among their own number.

VII. SAN MARINO.

The republic of San Marino is about the smallest state in Europe; it is situated on the northern part of the dominions of the Pope. It contains an area of about 22 square miles, and a population of 7,000. It has maintained its independence for 13 centuries.

VIII. KINGDOM OF THE TWO SICILIES.

The kingdom of the Two Sicilies, or Naples, consists of the southern portion of Italy and the island of Sicily.

The volcanic mountains of Vesuvius and Etna are both in this kingdom.

Sicily is a very fertile island,—it used to be de the granary of Rome. Earthquakes are freque structive.

Amongst other articles, sulphur is largely from South Italy, but especially from Sicily.

The principal towns are the following,—

Naples, the capital of the kingdom; the scenery surroundi nificent. Pop. 360,000.

Palermo, the capital of the Island of Sicily. Pop. 170,00

Messina, on the Sicilian side of the strait, is a flourishing was nearly destroyed by an earthquake in 1783. Pop.

Catania, a large city at the foot of Mount Etna; has fre destroyed by lava and earthquakes.

Syracuse, the ancient capital of the island, and the birth- chimedes, retains but little of its former splendour.

Marsala, is a sea-port on the west of the island, famous for

The government is monarchical; the religi man Catholic. The people are voluptuous, but little pretensions to virtue.

TURKEY IN EUROPE.

BOUNDARIES.

N. by Austria and Russia.—E. by the Bla S. by the Sea of Marmora, the Archipelago, a —W. by the Gulf of Venice and Dalmatia.

EXTENT.

It lies between 39° and 48° N. lat., and 16° long. Its extreme length is 700 miles, its bre same. It contains 162,000 square miles.

European Turkey is but a small portion of the Turkis which extend over a considerable part of Asia.

CAPES, BAYS, ISLANDS, ETC.

The principal Gulfs are, Arta and Volo, on t frontier; Salonica, Cassandra, Monte Santo, tessa, which are formed by the three remar

ıs, Capes Pailluri, Drepano, and Monte Santo; and
ulf of Saras, formed by the peninsula which ter-
es in Cape Helles. The islands of Lemnos, Thaso,
, and Samothraki, belong to Turkey.

Strait of Constantinople is about a mile broad; a strong cur-
s through it from the Black Sea. The broken and precipitous
nce of the rocks on each side leads to the opinion that the Black
s at one time without a vent, and that by some convulsion of
the two continents were in this part wrenched asunder.

Dardanelles, or Hellespont, over which Xerxes attempted to
bridge of boats, is 33 miles long, its average breadth 1½. It
swept by a strong current.

MOUNTAINS AND RIVERS.

rkey contains a number of mountains. From the
n range, which is a continuation of the Alps, a chain
hes off to the Carpathians, and forms for some dis-
the boundary between Turkey and Austria. The
ıs is a southern branch of the Hæmus or Balkan
. Olympus and Ossa are celebrated summits; be-
them lies the pleasant vale of Tempe.

e Danube is the principal river of Turkey. Its banks
latter part of its course are low and swampy, and
ers the navigation is interrupted by cataracts; near
l it enters the Black Sea by several mouths.

e Pruth, a feeder of the Danube, forms the N. E.
lary of Turkey. The Save, another tributary on the
ompletes, with the Danube itself, the natural bound-
of Turkey on the northern frontier.

e Maritza flows past Adrianople into the Archipelago.

e Vardar goes into the Gulf of Salonica.

CLIMATE AND SOIL.

e climate of Turkey is generally delightful, though
of its mountains approach the regions of perpetual
lation. Constantinople is subject to sudden changes
nperature, being unprotected from the cold blasts
ave swept Siberia and the Steppes of Russia; and

when this wind yields, it generally is to the south wind, which is as hot as the other is cold. The soil is deep and rich, but is badly cultivated, agriculture being much discouraged by the Turks.

MANUFACTURES AND COMMERCE.

The manufacture of carpets is the only one for which Turkey is noted. Its exports are trifling, consisting of silk, carpets, hides, goats' hair, &c. It imports very largely cotton goods, hardware, and other manufactured articles from England; coffee from Alexandria and the West Indies; sugar, corn, &c.

Vessels taking goods to Constantinople are generally obliged to go to Smyrna, Odessa, &c., to get return cargoes.

Trade is chiefly in the hands of the English, French, and other European merchants, (denominated Franks,) and of Armenians and Greeks.

PROVINCES.

Turkey is generally divided into nine provinces or regions, namely, Moldavia, Wallachia, Bulgaria, Servia, Bosnia, Croatia, Herzegovina, Albania, and Roumelia, which comprehends the ancient Macedonia, Thrace, and Thessaly.

TOWNS.

Constantinople, the metropolis of the empire, and the chief city of the Mahometan world; the houses are chiefly of wood, and disastrous conflagrations are frequent. Its situation for trade between the two continents, and its harbour, are the finest possible. The principal buildings are the Seraglio, which is the palace of the Sultan, and the Mosque of St. Sophia, built by Justinian. The Turkish burying-grounds are all on the opposite shore, at Scutari. Pop. about 700,000, but including Scutari and the environs, about a million.

Adrianople, Roumelia, formerly the capital of the Ottoman empire in Europe; it is situated in a rich plain, and when viewed from a distance has a magnificent appearance, but as is the case in most Turkish towns, the illusion vanishes on entering. Pop. 90,000.

Buckharest, r. Damboritza, a feeder of the Danube, the capital of Wallachia. Pop. 70,000.

Saloni'ca, (*pro.* Salonee'ka,) Macedonia, the ancient Thessaloni'ca.

Sophia, a mean city, the capital of Bulgaria.

Belgrade, Servia, very strongly fortified; its situation on the frontier of Hungary renders it an important military post.

avalla; the ancient Neapolis, Macedonia: probably the first European city in which the gospel was preached, the apostle Paul having landed here on his road to Philippi.

POPULATION.

Ten millions. The Turks are a tribe of Tartars, from e neighbourhood of the Caspian Sea. From their leader thman, they took the title of Ottomans. In 1352 they rst crossed the Hellespont; and so successful was their vasion, that they threatened at one time the security of urope. The Austrian capital was twice besieged by em, but without success.

Of the population of European Turkey the Ottomans are supposed form not more than a third; the remainder is made up of Greeks, rmenians, Jews, and people from the surrounding nations. Each rson retains for the most part his native language, a serious obstrucn to general intercourse.

CHARACTER, GOVERNMENT, AND RELIGION.

The deportment of the Turks is solemn and slow; and ey appear sedate, passive, and humble; but they are sily provoked, and are very vindictive; they will sacrice any thing to gratify their revenge. They dress in ng loose garments, wear turbans on their heads, and ffer their beards to grow. They sit cross-legged upon rpets. Polygamy is practised, and the women are kept a very depressed and degraded condition.

The government is despotic; the Sultan or Grand gnior having the absolute disposal of the lives and prorties of his subjects. The chief officer of the Sultan is e Grand Vizier. The governors of the different pronces are called Pachas. The present Sultan is Abdul edjid. The religion is Mahometan.

ANCIENT NAME.

The most important of the ancient divisions correspondg to modern Turkey, were Dacia, N. of the Danube; œsia, superior and inferior, between the Danube and e Hœmus range; and S. of it Macedonia and Thrace.

long. Its length and breadth are both nearly 2
It consists of three portions; the continent
vadia,—the Peninsula or Morea,—and the
islands in the Archipelago, the chief of which ar
pont, Skyro, Andro, Zea, Paro, and Naxia.

The island of Corfu, off the coast of Turkey, and P
Maura, Ithaca, Cephalonia, Zante, and Cerigo, off the coast
form the Ionian republic, which is under the protection of Gr
The island of Crete, or Candia, forms the southern boun
Grecian Archipelago; it at present belongs to the sovereign

BAYS, CAPES, ETC.

The Gulfs of Lepanto and Egina separate Liva
the Morea; the other gulfs are Arcadia, Koron,
thia, and Napoli. The principal capes are Gallo
pan, Malea, and Colonna. The isthmus of Corint
the Morea to the main land.

FACE OF THE COUNTRY.

The Pindus range of mountains runs through t
tinental part of Greece, and terminates at Cape C
the principal heights are Lyakoura, the ancient Pa
and Zagara, the ancient Helicon. Several mino

iits an epitome of the climate and productions of ons; the balmy atmosphere of Greece has been ted for many ages; the soil is in many parts very but is badly cultivated.

TOWNS.

cipal towns in the northern part are—Athens, the renowned of ancient Greece, the seat of government; it contains many sting remains of antiquity, the chief are the Acropolis or citand the Parthenon or Temple of Minerva;—Negropont, the l of the island of that name; a bridge here crosses the channel, g the island with the main land;—Thiva or Thebes;—Livadia, pital of the province;—Salona;—Lepanto;—and Missolonghi, Byron died.

lorea are Napoli di Romania, for some years the capital of mo- Greece, a strongly fortified town;—Argos;—Corinth, now a village;—Tripolitza;—Mistra, near the site of the ancient a;—and Hydra, on a rocky isle of the same name, off the eastoast; it was the centre of those gallant operations, by which odern Greeks achieved their independence.

LATION, GOVERNMENT, RELIGION, AND LANGUAGE.

population is about 900,000.

Greeks are a rude and unenlightened people, but and enterprizing. Their language is the Romaic, does not differ essentially from the ancient Greek. ece till lately formed part of the Turkish dominions, now erected into a separate kingdom, under the tion of Great Britain, France, and Russia. Its nment is a constitutional monarchy; the present s Otho, a Bavarian prince. The established relis that of the eastern or Greek church.

QUESTIONS FOR EXAMINATION.

foregoing surveys of the different States of Europe may be he subject of examination by converting the heading of each into a question: as, What are the boundaries? Between what s of latitude and meridians of longitude is it situated? What ngth, breadth, and the number of square miles it contains? s the natural geography;—as rivers, lakes, mountains, and the the country? What is the nature of the climate, &c.

ASIA.

GENERAL VIEW.

Boundaries.—Asia is bounded on the N. by the Arctic Ocean.—E. by the Pacific.—S. by the Indian Ocean.—W. by Europe, the Black Sea, the Archipelago, the Mediterranean, and the Red Sea.

It is thus bounded naturally on three sides, and in part on the fourth. It is extensively connected with Europe on its western frontier, it is joined to Africa by the isthmus of Suez, and on the E. reaches to within 40 miles of the other great continent, America.

Extent.—It lies between 1½° and 77° N. lat., and between 27° E. and 170° W. long. Its length from Bab-el-Mandeb to Bhering's Strait, is 7,000 miles, and its breadth from N. to S. 5,400. It is supposed to contain 17,500,000 square miles, being the largest of the great continents of the earth, and having an area above four times that of Europe.

Coast.—Asia presents, in proportion to its size, a solid and compact figure; but though its outline does not exhibit the numerous and extensive limbs of Europe, it is not so destitute of them as Africa.

On the north, an extensive projection of Siberia terminates in Cape Severo Vostotchnoi; on the east, there are the peninsulas of Kamtchatka and the Corea; on the south, Camboja, Malaya, southern India, and Arabia; and on the west, Asia Minor stretches far into the Mediterranean, separating the Black Sea from it.

Seas.—By these extensive promontories several minor seas are formed.

The sea of Okhotsk is divided from the great ocean by Kamtchatka; the sea of Japan is enclosed by the Japanese islands; Corea forms the Yellow Sea; the Chinese sea is separated from the Pacific Ocean by Borneo and the Philippine Isles. The gulfs of Tonquin and *Siam* communicate with the China Sea. India has the

Bay of Bengal on its east, and the Arabian Sea on its west coast; the Persian Gulf on the one side, and the Red Sea on the other, peninsulate Arabia.

Mountains.—The centre of Asia consists of an immense and lofty table-land. The mountains of Altai and Yabloni bound this region on the north, and the Himalaya on the south. On the east, it descends by a succession of terraces not fully explored; the principal ranges on the west are the Taurus and the Caucasus.

Lakes.—Inland seas form a characteristic feature of Asia. The Caspian Sea is 750 miles long and 270 broad.

Its level is about 100 feet below that of the Black Sea. Should any convulsion of nature depress the low sandy tract which now separates the Sea of Azof and the Caspian, the waters of the Black Sea, the Mediterranean and the Atlantic, would inundate an enormous extent of the sandy steppes of Asia, and entirely change the climate and face of that portion of the earth. The waters of the Caspian are brackish, it has no tides, but gales of wind raise a heavy sea; it abounds in fish.

The Sea of Aral is separated from the Caspian by a low sandy isthmus, 150 miles across.

Although it receives numerous rivers, its waters are supposed to be diminishing; the southern extremity is studded with islands.

Baikal, a fresh-water lake on the southern confines of Siberia, is about 400 miles long, and 53 miles broad.

The surface of the lake is subject to violent agitations, even during a calm,—the hidden cause is probably of a volcanic nature.

Rivers.—The principal rivers of Asia have their origin in the table-land of the interior.

The Obi, the Yenisei, and the Lena, flow into the Arctic Ocean; the length of each is upwards of 2,000 m.

The Amoor, 2,200 miles long, the Hoang-Ho, 2,900 and the Yang-tse-Kiang, 3,200 miles long, flow into seas communicating with the Pacific.

The Mekon, or river of Camboja, the Irawady, the Brahmaputra, the Ganges, the Indus, and the Shat-al-

Arab, formed by the junction of the Tigris and Euphrates, are the principal rivers of southern Asia.

Climate.—The greater part of Asia is situated in the north temperate zone, but owing to the elevation of the central part, its climate is generally cold. The Himalayan range protects India from the cold blasts of the north,—it accordingly feels the full influence of a torrid clime. The eastern side is colder and more moist than the west.

States.—The principal countries of Asia are,—Asiatic Russia, in the north; Tartary, Mongolia, and China, in the central region; Turkey in Asia, Arabia, and Persia, in the west: Hindostan′, and India beyond the Ganges, in the south.

Population.—Asia, the cradle of the human race, is still the most populous of the four great divisions of the globe; including Australasia and Polynesia, it probably contains 600,000,000 inhabitants.

Religion.—Though the light of divine revelation beamed for centuries from Asia, when the other parts of the world were in utter darkness, and though the Redeemer of mankind lived, and died, and rose again within its precincts; the millions of its present population, with but few exceptions, are under the yoke of Mahometan superstition or heathenish idolatry. As a necessary consequence, vice and immorality prevail; polygamy is generally allowed, and the female character is universally degraded.

Natural Productions.—There is no precious or useful mineral which is not found in this continent. Vegetation is extremely rich and various. In the temperate regions the vine attains perfection. Syria is the native region of the olive. Tea is peculiar to this continent, and is produced abundantly in the southern provinces of China. The sugar-cane flourishes in many regions. Rice is the chief support of the Hindoos, Chinese, and other races, who value it so highly that they pity Europeans for having no rice at home, and wonder how they can exist without it. The date is the staff of life, in Arabia and the neighbouring countries, the inhabitants of which in their turn pity the rest of mankind.

Asia teems with animal life. The reindeer in the north, and the camel in the arid plains of the south, are of essential service to man. These animals, unlike the other domestic tribes, will not bear removal from their native home. The varieties of the ox-tribe are numerous, and differ from those which are peculiar to Africa and America in being capable of domestication. The natural result of this distinction has been the distribution of the common ox, the most important of the Asiatic species, over the whole world, while the buffalo of S. Africa and the bison and musk-ox of N. America are confined to their native wilds. The elephant, rhinoceros, horse, and ass, have their home in the forests and plains of Asia. The sheep and the hog, as in every other region, abound. The lion is becoming rare; he is now found only in the deserts of Mesopotamia, Persia, and India. The tiger and other feline animals here attain their greatest perfection. The principal Asiatic species of monkeys are the orang-outang and the gibbons. As a general fact, the Asiatic monkeys are inferior in structure and intelligence to the African, but much superior to the American.

In birds, Asia is less abundant than some other regions, but it yields the original stocks of those most valuable to man, the common fowl, the pheasant, the partridge, and peacock. Alligators are very destructive in the rivers of India. Of serpents, the most dangerous is the Indian python, which is often confounded with the boa constrictor of America.

TURKEY IN ASIA.

Turkey in Asia consists of Asia Minor, Syria, and the region watered by the Tigris and Euphrates.

These countries are connected together by a system of mountains, of which Mount Ararat may be considered the centre. The Taurus proceeds westward through the whole of Asia Minor, and terminates in the celebrated summits of Ida and Olympus; a corresponding range runs eastward through the north of Persia; a southern branch proceeds to the borders of the Persian Gulf. A subsidiary chain springs from the Taurus, at the source of the Euphrates, and running for some distance parallel with the Mediterranean, terminates in Lebanon.

The whole of the countries of Asiatic Turkey have been nearly desolated by Turkish despotism and Mahometan delusion; the chief interest of them consists in the remembrance of what they have been, and the anticipation of what they may again become.

ASIA MINOR.

Situation.—Asia Minor, or Anatolia, occupies the western peninsula of Asiatic Turkey; it is separated from Europe by the St. of Constantinople and the Dardanelles.

Islands.—The western coast is studded with islands; the largest are Mytelene, Scio, Samo, and Rhodes.

Tenedos, a small island guarding the entrance into the Hellespont, or Dardanelles, is celebrated in the history of the siege of Troy; and Patmo, to the south of Samo, is interesting as the place to which the Apostle John was banished, and where the "Revelation" was given him.

Cyprus, to the south of Asia Minor, is 140 miles long and 60 broad; it was celebrated in ancient times for its wealth, population, and voluptuousness. It is now almost deserted, and full of ruined towns.

Rivers.—The Kizil Irmak, (an. Halys,) flows into the Black Sea. The Mendre, the ancient Meander, falls into the Archipelago. The near approach of the Taurus range to the southern coast, renders the rivers in the south, short, rapid, and precipitous; the largest are the Syhoon and Jyhoon.

Climate.—The climate is delightful. The heat is moderated by the mountains, and the vicinity of three seas deprives winter of its severity.

The southern coasts are, however, liable to oppressive heat, and the whole country is often visited with earthquakes.

Produce.—Besides the choicest fruits, the oak producing the gall-nut abounds. Copper, the only mineral, is procured near Tocat. The soft wool of the goats of Angora is an article of commerce. The exports are raw silk, dried fruits, opium, and other drugs, Turkey carpets, &c. The imports are grain, cotton, woollen and silk goods, coffee, sugar, &c.

Provinces.—Anatolia, (which term is often applied to the whole country,) Roum and Karamania.

The chief towns are Smyrna, Manissa, and Brusa.

Smyrna is admirably situated for commerce, at the bottom of a deep gulf on the western coast. It is a place of great antiquity, and is the only city addressed as one of the "Seven Churches" which remains; of the seven cities aspiring to be the birthplace of Homer, it appears to have the best claim. It is often visited by the plague, and frequently suffers from earthquakes. Pop. 130,000.

Manissa, a flourishing trade, and extensive plantations of saffron.

Brusa is a manufacturing town at the foot of Mount Olympus,—the capital of the Ottoman empire before the capture of Adrianople. The adjoining plain is covered for miles with mulberry trees, and silk is the stable produce of the place.

Tersus, (the ancient Tarsus,) once "no mean city," the literary rival of Athens and Alexandria, is in Karamania; it is much reduced.

SYRIA.

Situation.—Syria forms the south-western limb of Asiatic Turkey; the Euphrates separates it from the eastern.

Coast.—Its coast is destitute of good harbours;—its chief bays are Iskanderoon and Acre.

Seas.—The Bahr Lout, (Sea of Lot,) also called Lake Aspaltites and the Dead Sea, is in the south.

This lake occupies the site of Sodom and Gomorrah, its waters are extremely bitter and saline, and its shores are desolate. Its level is 1,337 feet below that of the Mediterranean.

Rivers.—It has only two rivers of importance, the Aaszy and the Jordan.

The Aaszy, the ancient Orontes, rises near Hamah, and falls into the Mediterranean, below Antioch.

The Jordan rises at the foot of Lebanon; passing directly south, through the waters of Merom and the Sea of Galilee, it empties itself into the Dead Sea. The Jordan, apparently from having worn for itself a deeper channel, no longer overflows its banks, but its waters rise several feet between the end of January and that of March, in consequence of the rains which fall on the high grounds.

Climate and Soil.—From May to August the sky is clear and without a cloud, but the nights are cold, and copious dews refresh the ground.

The land between Lebanon and the Euphrates is a desert; but the soil of Palestine is peculiarly fertile,—even in its present forlorn condition it may be characterized as a land flowing with milk and honey.

Towns.—*Jerusalem.* The most hallowed spot on the earth's surface, though with the rest of "the land" it now mourns. The mosque of St. Omar is built on the site of Solomon's temple. The church of the Holy Sepulchre was built originally by Helena, the mother of Constantine the Great. Pop. 30,000.

Damascus, a place of the highest antiquity (Gen. xiv. 15.); it is studded with mosques and minarets, and encompassed with gardens; it has considerable manufactures of silk and cotton, and a great caravan trade; figured silks were called damasks from this city. Pop. 130,000.

Aleppo, formerly a most important city, was nearly destroyed by an earthquake in 1822, and another in 1830; it is the emporium of northern Syria; manufacture of silk and cotton stuffs.

Antakia (Antioch), in the Pachalic of Aleppo, once the capital of Syria, and the frequent resort of the emperors of Rome, now of little importance. The term Christian, as a distinctive appellation, had its origin here.

Tripoli exports soap and sponge; was taken by the Crusaders in 1108.

Acre, the harbour the best on the coast; of great importance in the time of the crusades; bravely defended in 1799 against Buonaparte, who, after standing 61 days before it, was obliged to retreat; in 1840 the British took it by bombardment in three hours.

Beyrout, the port of Damascus, considerable trade.

Jaffa (Joppa), one of the most ancient sea-ports in the world.

Palmyra, the Tadmor of Scripture, a mass of splendid ruins in an oasis in the desert. In the third century its queen, Zenobia, defied the arms of Rome.

Baalbec, a splendid ruin occupying the site of the ancient Heliopolis.

Government.—Syria was for some time in the hands of the Pacha of Egypt, but as he threatened the independence of the Turkish empire, Britain, and some of the other great European powers, judged it necessary to expel him, and to oblige him to be content with the hereditary government of Egypt. The country is in a very unsettled state.

REGION OF THE TIGRIS AND EUPHRATES.

Situation.—The eastern portion of the Turkish dominions consists of the country watered by the Tigris and the Euphrates.

Face of the Country.—The northern part is mountainous and cold. Mount Ararat reaches an elevation of 17,000 feet; its summit was till recently considered inaccessible, and is covered with perpetual snow.

In the south the country is flat. The desert of Sinjar, which occupies a large space between the rivers, is an ocean of sand; the climate is consequently hot.

The Samiel, or Simoom, is a hot wind which is severely felt on the borders of Syria, Bagdad, and Arabia; it fills the air with dust and a suffocating vapour, and gives to the sun the appearance of blood; those who face it are instantly suffocated, and putrefaction of the body takes place immediately; the only means of escaping its effects is to lie flat on the ground.

Rivers.—The principal sources of the Euphrates are the Morad, which rises in Bayazid, not far from Mount Ararat, and the Frat, or Euphrates, which descends from the high grounds of Erzeroum. The river formed by the united streams obtains a passage through the Taurus chain by a defile, called the Nushar pass, and after passing Samasat, its most westerly range, verges to the Tigris, which it joins at Korna.

The Tigris, the Hiddekel of the Scriptures, rises above the town of Diarbekir, and passes Mosul and Bagdad. Its course being more direct than that of the Euphrates, its current is more rapid. Its name is derived from *Tigr*, signifying *an arrow*.

Provinces.—This region is divided into the Pachalics of Bagdad, Diarbekir, Van, Erzeroum, and Rokhah.

TOWNS.—*Bagdad* is the capital of the Pachalic of that name; the Tigris divides the city into two parts. In 1831 it suffered from the united ravages of inundation and pestilence. Pop. 70,000.

Busra, or *Bussora*, on the Shat-al-Arab, is the chief commercial town, and is the emporium of all the Indian commodities sent into the Turkish empire.

Diarbekir, r. Tigris; manufactures of leather, cotton, iron, &c.

Mosul, on the west bank of the Tigris; once famous for its fine cottons, hence named *Muslins*. On the opposite bank are the ruins of Nineveh.

Hillah, r. Euphrates; near it are extensive ruins, probably those of Babylon.

Ancient Name.—This region comprehends the ancient

Armenia, in which probably the garden of Eden was placed, Mesopotamia, Assyria, and Babylonia.

RUSSIA IN ASIA.

Boundaries.—N. by the Arctic Ocean.—E. by the Pacific.—S. by Persia, the Caspian Sea, Tartary, and Mongolia; and W. by Europe.

It consists of two distinct regions, Siberia and the countries of the Caucasus.

SIBERIA.

Extent.—Length 4000 miles, breadth 2000, and contains an area greater than that of Europe.

Coast Line.—Several islands are situated on its northern coast, the largest of which are the two denominated Nova Zembla (the new country).

The gulfs are, the Sea of Kara, the Gulf of Obi, and the Gulf of Anadir, near Behring's Strait.

Cape Severo Vostotchnoi is the most northerly point of all Asia, and Cape East the most easterly. Kamtchatka terminates in Cape Lopatka.

Rivers.—The Obi, the Yenisei, and the Lena.

The Irtish, rising in the summits of the Altai mountains, runs past Omsk and Tobolsk; at Samarova it is joined by the Obi, which runs past Tomsk, and which, though the smaller river, gives name to the united streams. The accumulated waters, passing Berezov, are met by the ocean in the Gulf of Obi.

The Yenisei passes by Krasnoiarsk, Yeniseisk, and Turukansk, on its way to the Arctic Ocean. Its principal feeder is the Tunguska, from the Lake Baikal.

The Lena, from the northern declivities of the Yabloni mountains, passes Yakutsk, and enters the ocean by several mouths.

The stillness and desolation of these mighty streams present a striking contrast to the activity observable on the banks of most large rivers.

Face of the Country.—The western part is generally flat, and contains numerous marshy plains, called steppes; but st of the Lena the country is mountainous. Kamtchatka ntains numerous volcanoes.

Climate.—The climate is peculiarly rigorous. In the rth one continued winter reigns; and in the south, ough the heat of the summer is powerful, and the pro-ess of vegetation peculiarly rapid, it is but of short ration, and is succeeded by a winter nine or ten months ng, of great severity.

This is the more remarkable, as the southern parts are in the same titude with London, Berlin, and Calais.

Productions.—The most valued productions of Siberia re its minerals and its furs. The richness of its mines as obtained for it the name of the Russian Peru.

The principal gold mines are those of Berezov. At Schlangenburg, tween the sources of the Irtish and the Obi, and at Nertchinsk, near e source of the Lena, silver abounds. Copper, lead, and iron, are und both in the Ural and Altai mountains, as well as the more rare etals, platina, arsenic, and cobalt.

The sable, the black fox, and the ermine, yield the furs which are in reatest request.

Commerce.—The rivers of Siberia greatly facilitate ommerce; their branches approach so nearly to one nother, that goods may be carried almost entirely by ater from Kiakhta to Europe,—the passage occupies hree of their short summers.

A considerable trade exists between Russia and China; he Chinese giving, in return for the furs of Siberia, tea, ankeen, and silk.

The hunters of Siberia, having pursued the objects of heir chase too eagerly, are obliged to cross Behring's trait to supply the deficiency from America.

Provinces.—Tobolsk, Omsk, Tomsk, Eniseisk, Irkoutsk, Yakoutsk, nd Okhotsk.

HIEF TOWNS.—*Tobolsk*, situated at the confluence of the Tobol with the Irtish; the metropolis of Asiatic Russia, a place of considerable commerce and a great thoroughfare. Pop. about 20,000.

Irkutsk, near Lake Baikal, the most commercial town in Siberia.
Tomsk, on the r. Tom, a tributary of the Obi, ranks the third town.
Kiakhta, on the common limits of Siberia and the Chinese empire; the only point of communication between China and Russia.
Nertchinsk, a place of banishment much dreaded by criminals, who are here employed in the mines.

Population.—Probably about six millions.

Government.—The government is a military despotism, —the whole of this vast country being kept in subjection by a few undisciplined troops.

REGION OF THE CAUCASUS.

The region to the N. and S. of the Caucasus is inhabited by a number of small nations, each having its own peculiar language. The principal of them are the Georgians on the S., and the Circassians on the N. of the range.

Russia claims the sovereignty of the whole district, but the Circassians have been for some time in a state of revolt.

Natural Geography.—This region presents every variety of climate, according to its elevation. In the centre barren rocks and eternal ice prevail; to the north are hills fertile in corn and rich pastures, and further on are sandy plains; to the south are magnificent valleys, displaying much of the luxuriance of a tropical vegetation.

Mount Elburz, the highest point of the Caucasus, is 17,000 feet high. The principal rivers are the Kuban, on the north of the chain, which flows into the Strait of Jenekali, and the Kur, on the south, which falls into the Caspian. The Aras, or Araxes, joins the Kur.

Commerce.—The incessant wars in which the various tribes engage are destructive of the commerce of this fine country. The beauty for which Circassian females are noted, renders them an object of considerable demand as slaves in the corrupt courts of the east. Numerous naphtha springs in the promontory terminating in C. Aspheron, are a source of wealth to the petty prince of the district.

Towns.—The principal are Tiflis and Derbend.

Ancient Name.—Sarmatia, on the north of the Caucasus; Colchis and Iberia, on the south; and Albania, at the eastern extremity.

ARABIA.

Boundaries.—N. by Asiatic Turkey.—E. by the Persian Gulf.—S. by the Arabian Sea.—W. by the Red Sea.

Seas.—The Red Sea is about 1500 miles long; its greatest breadth is less than 200. Its navigation is greatly impeded by coral reefs and numerous islands; the entrance to it, the Strait of Bab-el-Mandeb, (the gate of tears,) is so denominated from the dangers it presents to mariners. The Red Sea differs from all others in receiving no rivers.

Under the Ptolemies this sea was the great channel of intercourse between Europe and the East. After the discovery of the passage round the Cape, its commerce declined. The establishment of a line of steamers between Suez and Bombay has made it once again the highway between the eastern and western worlds. The time ordinarily occupied for performing the whole distance between London and Bombay is 30 days.

The Persian Gulf, which may be regarded as an expansion of the Shat-al-Arab, meets the ocean at the Strait of Ormuz. The pearl fishery is carried on to a great extent along its shores.

The south-west monsoon (or periodical wind) prevails in the Arabian Sea and Indian Ocean from April to October; the north-east monsoon blows during the remaining half of the year.

Face of the Country.—Arabia consists of an elevated table-land, declining towards the sea, where it is encircled by a belt of flat sandy ground. Arabia is destitute of rivers, and hence is little more than a great desert.

Mount Hor, where Aaron was buried, and Mount Sinai and Mount Horeb, famous in sacred history, are situated in that portion of Hedjaz which corresponds with the ancient Arabia Petræa.

Climate.—The air of Arabia is peculiarly clear,—the climate is warm, especially in the south. The nights are generally cool in proportion to the heat of the day, and the stars shine forth with a brilliancy unknown in other regions. The high grounds enjoy a rainy season, but the low lands are sometimes destitute of rain for several years.

Productions.—Arabia has long been celebrated for the abundance of its odoriferous plants, as frankincense, myrrh, and cassia. The coffee plant is a native of Yemen, and Arabian coffee is superior to every other.

Commerce.—Its trade has much diminished. For a long period Europe was supplied with the products of the east through Arabia; this is no longer the case. The concourse of pilgrims to Mecca was also a source of great wealth; this, too, has greatly declined.

Most of the commerce of Arabia is carried on in caravans, consisting of large trains of camels, merchants and armed soldiers.

The Arabian coffee which reaches Europe is sent by way of Bombay.

Provinces.—Hedjaz, Yemen, Hadramaut, Oman, Lahsa and Nedjed. The low ground of Yemen bordering on the Red Sea is called Tehama.

TOWNS.—*Mecca,* the capital of Arabia, the birth-place of Mahomet, and the metropolis of the Mahometan faith, is about forty miles inland from the Red Sea. The chief attractions to pilgrims are the Kaaba, or temple, a black stone, and the well of Zemzem. Its population, once 100,000, is now about 28,000.

Medina contains the tomb of the impostor.

Saana, Yemen, a place of great trade, chiefly in coffee.

Mocha, near Bab-el-Mandeb, formerly the chief sea-port of Arabia.

Aden, near the entrance of the Red Sea, belongs to Britain; its harbour is excellent; is a station for the steamers plying between Suez and Bombay.

Muscat, and *El Katif,* are sea-ports on the east.

Population.—The amount is exceedingly uncertain, probably about 12 millions.

The Arabs consist of two grand classes, those who dwell in towns, and the Bedouin, or wandering Arabs, who dwell in tents.

Character and Religion.—The character given in Scripture of Ishmael, is exactly that of the present Bedouin

Arab, who is a robber by profession; he is, however, hospitable, and faithful to his word.

The form of government is patriarchal. The Arabs have never been subdued; when one tribe is attacked, all unite in its defence. The religion is Mahometan.

The Arabic language is peculiarly copious.

Animals.—The camel, "the ship of the desert," is as valuable to the Arab as the reindeer is to the Laplander; the horses of Arabia are noted for fleetness and spirit.

The Arabian camels are of the one-humped species; the Bactrian or two-humped camel is chiefly used in central Asia; it is larger and stronger than the Arabian species, but not so well fitted to endure thirst and the privations of the desert. Those trained for riding, whether of the one or the two-humped species, were called by the Greeks dromedaries, (racers,) from whom we have borrowed the term. The ass of Arabia is a fine animal, and so spirited that it is common to say of a person of great vivacity that he is as brisk as an ass. Myriads of locusts are produced in the deserts; they are used for food, and are exposed for sale in the markets of all Arab towns.

PERSIA.

Boundaries.—The term Persia is usually understood to comprehend the region bounded on the N. by the Caspian Sea and Tartary; on the S. by the Persian Gulf and Arabian Sea; and lying between the Tigris on the W. and the Indus on the E.

This region consists of three independent states. Iran, or Persia Proper, forms its western portion; Affghanistan′, or the kingdom of Cabul; and Beloochistan′, the eastern.

Mountains, &c.—Regarding Mount Ararat as the starting point, a range, denominated in one part the mountains of Elburz, skirt the north of Persia, to meet the Hindoo-Coosh mountains, as the Himalayan mountains west of the Indus are called.

Another range, which may be called the mountains of Louristan, runs nearly parallel with the Tigris and the Persian Gulf to the entrance of the gulf.

The Soliman mountains on the east separate Cabul and Beloochistan from Punjab and Sinde.

The interior thus circumscribed consists of an elevated table-land; a large portion is occupied with deserts, the largest of which are the Great Salt Desert and the Desert of Kirman.

The lakes are, Shahee or Urumia, in Azerbijan, and Zurrah, in Affghanistan. There are no large rivers. The waters of the interior are for the most part lost in the deserts.

Climate.—On the low shores of the Caspian, the summer is hotter than in the West Indies, and the winters are mild; but in both seasons the moisture of the atmosphere is excessive. In the high land of the interior the summers are hot, but the winters are often rigorous.

On the shores of the Persian Gulf the simoom is experienced, and the heat of summer is so great as to render it dangerous to move abroad at mid-day.

Productions.—Persia is noted for the excellence of its fruits; the fig, the mulberry, the peach, the apricot, are indigenous, as well as many of the most esteemed ornaments of European gardens, anemonies, jessamines, tulips, ranunculi, &c. Agriculture, however, is much neglected; and many districts, once fertile, have become barren wastes. The silk-worm is extensively reared. The principal articles of manufacture are carpets and shawls.

Provinces of Persia Proper.—Azerbijan, Ghilan, and Mazandera, are on the shores of the Caspian; Khuzistan, Fars, Laristan, and Kirman, are on the Persian Gulf; Irak-ajemi and Khorasan are extensive provinces in the interior.

TOWNS.—*Teheran'*, in Irak-ajemi, the present capital of the empire; it is surrounded with a strong mud wall, four miles in circuit.

Ispahan, once the metropolis; though much reduced, it is still the chief emporium of Persia.

Shiraz, the capital of Fars; beautifully situated in a fertile valley—it has suffered much from war, and is rapidly going to decay. The ruins of Persepolis, once the splendid capital of Persia, are about 30 miles to the north-west of Shiraz.

Tabreez, the capital of Azerbijan, was twice destroyed by earthquakes.

Peshawer, capital of Cabul, a large town of little strength.

Cabul, near the southern base of the Hindoo-Coosh; carries on a great trade in horses between Tartary and India. In the recent retreat of the British from Cabul, nearly the whole force, consisting of 4,500 fighting men, besides 12,000 camp followers, were cut off.

elat, the capital of Beloochistan.

erat, the grand depôt of the commerce between Tartary, Persia, and India.

andahar, a flourishing city, on the great road between Persia and India; successfully defended by Gen. Nott during the late war.

Government and Character.—The government of Persia s a military despotism; justice, as in most other oriental ountries, is sold to the highest bidder.

The Affghans and Beloochees are divided into a number of tribes, ach possessing a distinct territory and governed by its own chief. The ffghans declare themselves to be descended from one of the sons of aul, King of Israel; their appearance is decidedly Jewish.

The prevailing religion is Mahometan, though there till remains a number of Parsees or fire-worshippers.

The Persians are considered the most polished of astern nations; but a great part of Persia Proper, as well as of the neighbouring states, is possessed by lawless ribes of wandering robbers.

The Persic is one of the most esteemed of Oriental anguages.

Animals.—The Persian horse is handsome, though not o fleet as the Arabian; the sheep is distinguished by an normous tail.

Ancient Name.—Irak-ajemi corresponds to the ancient Media, and Fars to Persia.

TARTARY.

Boundaries.—Tartary Proper is bounded on the N. by Russia in Asia.—E. by Mongolia.—S. by Persia and Cabul.—W. by the Caspian.

The term Tartary is often applied to the whole central region of Asia between the Caspian and the Pacific.

The Beloo Tag mountains, which connect the Himalayan with the Altaian range, form the natural boundary between Tartary Proper and Mongolia.

Face of the Country.—In the east it is mountainous, but descends in the west to the low plains of the Caspian and Aral; hence it may be regarded as the western declivity of the great central plain of Asia. Full one half of the country is covered by immense steppes; these are chiefly situated in the north.

Rivers.—The Amoo, or Jihon, (the ancient Oxus,) flows from the declivities of Hindoo-Coosh into the Aral; the Sir, or Sihon, also flows into the Aral Sea.

The course of the Oxus is changed,—it anciently flowed into the Caspian.

Climate.—The perpetual snow of its mountains, and the vicinity of Siberia, render its climate colder than its latitude would indicate; winter is sometimes very severe.

Productions.—The soil of Tartary is well fitted for pasturage, and the wealth of the inhabitants consists in their flocks. The horses are hardy; the camels are chiefly of the Bactrian or two-humped race; they are shorn, and the wool exported. There are no manufactures.

Political Divisions.—Tartary is divided into several independent states, the principal of which are, Bukhara, Karesm, Kokan, and Budakshan. Bukhara is by far the finest province.

Towns.—In a country chiefly occupied by wandering shepherds, towns are necessarily few. Samarcand, the capital of the empire of Tamerlane, and Bukhara, famed for its Mahometan college, are the chief. Balkh, an ancient city, is now a mass of ruins.

Character.—The Tartars are an ancient race, and have remained unconquered, whilst the surrounding nations have been repeatedly subdued; under Tamerlane they extended their conquests from Egypt to the very confines of China. The Tartar despises labour and a fixed residence;—horse-flesh and mare's milk is his favourite food. Mahometanism is the prevailing religion, though mixed with many Pagan rites and ceremonies.

MONGOLIA, OR CHINESE TARTARY.

Boundaries.—This immense region is bounded on the N. by Siberia.—S. by India.—W. by Tartary; and E. by he Pacific and China.

Face of the Country.—Chinese Tartary forms the most extensive table-land in the world, and from this elevated base several ridges of mountains rise. The Siolki mounains run parallel with the coast, and separate Mantchooria from the rest of Chinese Tartary. To the south are the Himalaya mountains, the highest on the globe, and supposed to attain an elevation of about 28,000 feet.

A great part of this extensive region is occupied with sandy deserts, the largest of which, the Desert of Gobi, or Shamo, is 1000 miles long; yet there are many fertile spots, especially in the neighbourhood of rivers.

There are several lakes in Tibet.

Rivers.—Most of the large rivers of Asia have their origin in Mongolia, but the Amoor is the only one which peculiarly belongs to it. It forms for some distance the boundary between the Russian and Chinese empires, and after a course of 2240 miles, falls into the Gulf of Tartary opposite to the island of Sagalien.

Provinces.—The central region is properly denominated Mongolia, but this name is frequently extended to the whole; Mantchooria is in he east, Little Bukhara in the west, and Tibet in the south.

Towns.—The principal are Kashgar and Yarkand, in Little Bukhara; and Lassa, in Tibet.

Population.—About 17,000,000. The habits of the Mongols closely resemble those of the Tartars. The Calmucks, a powerful tribe who inhabit the western part, are perpetually at war with the Mongolians of the middle and eastern parts; but the whole are subject to China.

CHINA.

Boundaries.—N. and W. by Mongolia.—E. by the Pacific.—S. by India beyond the Ganges, and the China Sea.

The great wall of China extends along the northern frontier; its length is 1,500 miles, its usual height 30 feet, and it is so broad that a carriage can drive along it. In some parts it is conducted over mountains 5,000 feet high.

Extent.—Between 20° and 42° N. lat., and 95° and 122° E. long. Its length and breadth are about 1,300 miles.

Coast.—It possesses a coast line of upwards of 2,000 miles, which, with its numerous harbours, fit it for being an important maritime country.

The islands are, Loo Choo, Formosa, and Hainan.

Mountains.—The Nan-ling mountains are a continuation of the Himalayan; the Peling are parallel to these, and divide the basins of the two great rivers of China.

Rivers.—The Hoang-Ho, or Yellow River, and the Yang-tse-Kiang, rise near the same spot in Mongolia; in their progress to the sea they are separated to a distance of 1,100 miles; at length they again approach, and terminate their majestic course within 110 miles of each other.

The Hoang-Ho carries a great deal of mud into the Yellow Sea; hence, probably, the increasing shallowness of this sea.

Canals.—A line of inland navigation extends, with one interruption, from Pekin to Canton, a distance of 1,600 m.

It has been formed by following the course of some rivers, and directing the waters of others into new channels. The mode of conducting water over declivities by locks is unknown to the Chinese.

Climate.—The cold of the northern part is sometimes severe; winter reigns for two or three months with a rigour exceeding the same parallel in Europe, but is succeeded by a summer of excessive heat. The southern parts possess the climate of the torrid zone, in which they are situated.

Productions and Commerce.—Rice is produced in great quantities, and is the chief food of the Chinese. Tea, a beverage used by the whole civilized world, is procured only here and in Japan and Assam; and here it is produced in perfection only between the parallels of 27° and 31°. Silk is an important article both of manufacture and export. Cotton is raised; and the fabrics of Nankin are much esteemed. The sugar-cane flourishes in the south. The porcelain of China has been carried to a degree of perfection, which Europeans have but lately been able to approach.

Opium, a prohibited article, is in great quantities smuggled into China from India; it is smoked, along with other herbs, by all classes of people.

Towns.—Pekin, the capital of the empire, is surrounded by lofty walls 15 miles in circumference. Pop. 2,000,000.
Nankin, on the Yang-tse-Kiang, formerly capital of the empire.
Canton, formerly the only port open to foreigners, is a place of great trade.
Macao, on an island of the same name, was built by the Portuguese and is the only European settlement in the Chinese empire, except Hong-Kong, which belongs to the British.
Amoy, Fow-tcheou-fou, Ningpo and Shanghai, are also ports open to the English and other foreigners.

Government and Religion.—The government is a sort of patriarchal despotism; the emperor is the sole source of rank, honour, and power; his rule is, however, generally mild. The religion of the higher ranks is a kind of deism, while the lower classes are Buddhists, and grossly superstitious.

Their gods are innumerable. They have no sabbath. They celebrate the festival of the full moon by keeping up a riot all night, and during the first two days after the first full moon of the year they celebrate the feast of lanterns, when the whole country is illuminated.

Character.—The Chinese are in a half-barbarous condition; polygamy is not allowed, the women are, however, the slaves of their husbands or masters. The practice of destroying infants is sanctioned by law. The jealousy of the Chinese is the most remarkable feature of their character. Emigration is prohibited, but great numbers of men notwithstanding contrive to leave the country.

A Chinese female is vain of her beauty in proportion to the smallness of her eyes, the protuberance of her lips, and the smallness of her feet. Among the men, corpulence, as the indication of an easy life, commands respect.

Many of the arts seem to have been known here earlier than in Europe; but they have been long stationary, and are now far excelled by all the nations of the west.

The language is a stage between the hieroglyphical and alphabetic; artificial signs, in nearly every instance, are substituted for pictorial representations, But every word has a separate symbol; hence the number of characters is very great, probably about 40,000, and he is a learned man who knows his *alphabet.*

Population.—China contains 367 millions of inhabitants.

JAPAN.

The empire of Japan consists of several islands lying off the coast of Mongolia and China. The largest islands are, Nipon, Jesso, and Kiusiu. It includes an area of about 100,000 square miles, and has a population of about 30,000,000. The principal productions of these islands are rice, a species of bean named *daid-su,* silk, tea, varnish, camphor, and other gums. The jealousy of the Japanese, which exceeds even that of the Chinese, has restricted their intercourse with Europeans to the narrowest bounds.

HINDOSTAN.

Boundaries.—N. Himalaya mountains.—E. Burmah.—S. Indian Ocean.—W. Cabul and Beloochistan.

Extent.—It is between 8° and 35° N. lat., and 68° and 92° E. long. Its length is about 1,900 and its breadth 1,500 miles; it comprises a surface of 1,280,000 square miles.

Coast line.—The great extent of sea coast gives to India the character of a peninsula. The only gulfs are those of Cutch and Cambay, which form the peninsula of Gujerat. Cape Comorin is the only remarkable promontory.

From Cape Comorin to Bengal there is not a single natural harbour; and owing to a heavy surf, vessels cannot approach the shore.

Islands.—Ceylon is 250 miles long, and 150 broad.

separated from the main land by the Gulf of Manara, rated for its pearl banks, and Palk's Strait.

lon contains a remarkable conical hill 7,000 feet high, called s Peak. On the summit is a mark like a foot-print, said by the itious natives to have been left by Buddha when ascending to ι. A ridge of rocks, called Adam's Bridge, extends from the to the main land. Ceylon is rich in minerals. The cinnamon grows only here and in Cochin China. The cocoa-nut and fruit trees flourish with singular vigour, and the talipot palm, the of which are large enough to shelter many individuals, grows ıntly. The elephants of Ceylon are smaller than those of other ies, but they are valued for their greater strength and docility. hief towns are Kandy and Colombo. Point de Galle (*pro.* in the S., is a station for the line of steamers plying between ta and Suez.

untains.—The whole of the north of the peninsula kes of the mountainous character of its northern dary: several belts of mountains cross the country een the Himalaya mountains and the Gulf of Cutch, the height of the intermediate valleys renders the e of this region an elevated table-land. The re- der of the peninsula is girt by a range of mountains, ı runs parallel with the coast, called on the one side estern, on the other the eastern Gauts. An exten- sandy desert lies to the east of the Indus.

vers.—India is distinguished by the number and the ıitude of its rivers, and to this it owes, in a great ure, its proverbial fertility; the largest are the In- the Ganges, and the Brahmaputra or Burrampooter. r principal streams have their origin within a few of each other, in Tibet, long. 81° E., lat. 31° N. he rivers of India have a sacred character, though in so eminent a degree as the Ganges. Steam navi- n has lately been introduced on the Ganges, and recently on the Indus.

Indus pursues for the first 400 miles a north-west course, on the side of the Himalaya range, until, escaping through a defile in the

Hindoo Coosh, it turns to the south, and makes for the ocean. At Mittun it receives the united volume of five large rivers, which water and give name to Punjab (five rivers); the largest of these is the Sutledge. From Hydrabad to the sea the Indus is generally about a mile in breadth; but in July and August it overflows its banks, and deluges the surrounding country to a great extent—it enters the sea by several mouths. The country through which the Indus flows, though naturally fertile, has long worn a barren and uninteresting aspect. British rule and the introduction of steam navigation will probably soon elicit its powers.

The Ganges, the sacred river of the Hindoos, first appears at the Gangootri, (cow's mouth,) an opening in the Himalaya mountains; it flows past Allahabad, Benares, and Patna: when within 250 miles of the bay of Bengal, it enters a flat country, and divides into a multitude of streams: the principal of these is the Hoogly, on which Calcutta stands.

The region intersected by the mouths of the Ganges, is called the Sunderbunds; the rank brushwood, denominated jungles, with which it is covered, is the resort of tigers and other ravenous beasts. The waters of the Ganges are augmented by several large rivers. At Allahabad it receives the Jumna, and in the vicinity of Patna it receives the Gogra and Gunduck from the north, and the Sone from the south. At the end of July, when the overflowing of the Ganges is at its height, all the lower parts of Bengal are covered with water for a hundred miles in width. The Ganges flows through a fertile country, and its waters are considered sacred by the Hindoos, who are sworn by them in the courts of justice in Bengal, as a Mahometan by the Koran, or a Christian by the Gospels.

The Brahmaputra (son of Brahma) runs for nearly 900 miles on the north side of the Himalaya mountains, in a direction opposite to that of the Indus; it escapes to the south of them, near Sudiva, and pursuing a southerly direction, it falls into the Bay of Bengal along with the Ganges. It runs for the greater part of its course through a desert and almost unexplored region, and is but little esteemed by the Hindoos.

Besides these three great rivers, there are the Nerbudda and Tapty flowing into the Gulf of Cambay, and the Kistnah, Godavery, and Cavary, which fall into the Bay of Bengal.

Climate.—Only two seasons are known in India, the wet and the dry, occasioned by the north-east and south-west monsoons. During the dry season, vegetation languishes, and a stranger looks in vain for the riches of India; when the rain sets in, the meadows are instantly covered with the most luxuriant verdure. In the interior and western parts of India the rainy season begins in April or May, and continues to October; on the Coromandel coast it begins later, as the clouds which are brought by the south-west monsoon are detained by the western Gauts.

The heat is sometimes extreme; in Bengal and the northern Circars, where it is usually greatest, the thermometer is sometimes as high as 110° or 115°. The alternate land and sea breezes moderate the heat on the sea shore.

At the commencement and termination of the rainy seasons, hurricanes with tremendous storms of thunder and lightning are experienced.

Productions.—The soil of India is singularly fertile, and little else than careful irrigation is necessary to call forth its powers. Besides rice, which is the staple article, sugar, coffee, tobacco, silk, cotton, indigo, and opium, are produced. The teak tree, rivalling the oak in durability, is the most valued forest tree, and is much used in ship-building. Its mineral riches are great; before the discovery of Brazil, it was the only place where the diamond was found; sapphires, topazes, and rubies, are procured as well as gold and silver.

Trade.—The chief exports are sugar, opium, silk, cotton, shawls, spices, and drugs. Cinnamon and coffee are the most important exports from Ceylon. The chief imports are British manufactured goods, especially cottons. The trade with India has greatly increased of late years.

Provinces.—The principal political divisions are:—

1st. Those bordering on the Himalaya mountains; Punjab or Lahore, Nepaul, and Bhotan.

2d. Those in Hindostan Proper; Sinde, Cutch, Gujerat, Rajpootana, Delhi, Malwah, Oude, Allahabad, Bahar, and Bengal.

3d. Those of the Deccan, containing—Concan, Candeish, Arungabad, Berar, Bejapoor, Hyderabad, Gundwanah, Orissa, and the Circars.

4th. Southern Hindostan; Canara, Malabar, Mysore, Cochin, Travancore, and the Carnatic.

TOWNS.—*Calcutta*, the capital of India, r. Hoogly, about 1
from the sea; 122 British soldiers perished in the Black
Calcutta in 1756. Pop. 500,000.

Benares, r. Ganges, the holy city of the Hindoos, and the chi
Brahminical learning; a place of considerable trade.

Madras, on the Coromandel coast; the surf forbids the ap
common boats; ships lie in the open roads and discharge
goes by *catamarans*. The British obtained the Madras te
1639; it was their first acquisition on the continent of India

Bombay, on an island of the same name; is one of the best
in India, and has extensive wet docks; many ships are b
In the neighbouring island of Elephanta is a celebrated te
cavated out of the side of a rocky mountain.

Tanjore, the native capital of southern India: its pagoda an
are celebrated.

Trichinopoly, famous for the siege of 1755.

Seringapatam, the capital of Mysore, under Hyder Ali and
Sultaun; taken by storm by the British in 1799.

Surat, r. Tapty, a large and ancient city; its commerce is i
the vicinity of Bombay.

Delhi, r. Jumna, the ancient capital of the Mongul empire.

Serampore, r. Hoogly, late a Danish settlement; the princ
tion of the Baptist missionaries.

Juggernaut, notorious for the abominations of idol worship,
the sea coast of Orissa.

Population.—The whole population is 134,000,0
these 123,000,000 are under the British governme

Manners.—The Hindoos are divided into four di
castes or grades of society; the Brahmins or pries
Cshatriyas or soldiers; the Vaisyas, who are husba
and merchants; and the Sudras, who are devoted to
offices; but the most abject of all are the Pari
those who have lost caste altogether. The Hindo
inoffensive, but indolent and regardless of the trut
women are in a degraded state.

The Hindoos are gross idolaters; their chief deit
Brahma, Vishnu, and Siva; they believe in the tr
gration of souls; penance and self-torture are t
essential to holiness; and the burning of widows

ile of their husbands has but recently been abolished by British interference, and is still secretly practised.

Besides the native Hindoos, there are many Mahometans, who are f foreign extraction, and some Parsees.

Government.—The whole of India, with the exception f Punjab, Nepaul, Bhotan, and Malwah, is in the posession of the British or is under British influence. English laws have to a considerable extent been introuced, though the Mahometan and Hindoo codes, out of egard to the prejudices of the natives, are observed in ome places. For the purposes of government, India is ivided into the three presidencies of Bengal, Madras, nd Bombay.

Animals.—The elephant ranges wild in the forests and s domesticated throughout the peninsula; and its rival he rhinoceros is met with. The lion is found chiefly in he northern provinces; the tiger abounds in the jungles. The ox and the cow are treated with veneration by the atives. Serpents swarm in the gardens, and even inrude into the houses. Alligators frequent the rivers, nd sharks infest the coasts.

INDIA BEYOND THE GANGES.

Boundaries. — The countries classed together under he general title of India beyond the Ganges, are bounded n the N. by Tibet and China.—W. by India and the Bay f Bengal.—S. by the Straits of Malacca and the Gulf of Siam.—E. by the China Sea.

Coast.—The gulfs are, Martaban, Siam, and Tonquin. The Strait of Malacca separates Malaya from Sumatra. The three remarkable peninsulas of this region severally erminate in C. Negrais, Point Romania, and C. Camboja.

Rivers.—The Irawady, flowing past Ummerapoora and Ava, enters the Gulf of Martaban by several mouths. The Saluen or Thaluan flows into the same gulf. The

Menam joins the Gulf of Siam at Bang-kok. The Mekon or Camboja river is one of the great rivers of Asia; it rises in Mongolia, and falls into the China Sea.

Productions.—All the ordinary products of a tropical clime flourish here. Burmah abounds in petroleum wells, Malaya abounds in tin, Camboja yields the gum which bears its name (gamboge). The elephants of these countries are admired for their beauty and sagacity.

States.—The most powerful of the Trans-Gangetic States is Burmah. Aracan and Lower Assam, with the region between, the British obtained by conquest from the Burmese in 1826. Upper Assam and Munnipoor lie between the British possessions and Burmah. Laos, to the east, is a feeble state, scarcely able to maintain an independent existence. To the south of Laos is Siam, the western portion of which is in the possession of the British; the Siamese have, however, added to their territory on the east by the conquest of half of Camboja. The empire of Anam consists of the States of Tonquin, Cochin China, and Camboja, east of the Mekon, united in one general confederacy. The Malayan peninsula consists of a number of petty sovereignties. The British have settlements at Malacca and at Singapore.

TOWNS.—*Ava,* the ancient and again the present capital of Burmah.
Ummerapoora, prior to 1819 the seat of the government of Burmah.
Rangoon, the principal sea-port of Burmah.
Bang-kok, the present capital of Siam, is built upon a swamp; there is little intercourse but by water.
Singapore, on an island of the same name, south of Malaya, is an important British possession; the channel to the south of it being now the grand route of the commerce between the eastern and western portions of maritime Asia.

Character.—The Burmese are a nation of soldiers; the Malays are a nautical people, and many of them are addicted to piratical practices.

ISLES OF THE PACIFIC.

The immense Pacific, which stretches between Asia and America, a distance of more than 10,000 miles, contains a vast number of islands, some of which are of great extent. They are divided into three great groups, the *Eastern* Archipelago, Austral Asia, and Polynesia.

EASTERN ARCHIPELAGO.

Borneo, next to New Holland, the largest island in the world, is 750 miles long and 620 broad.

This island, which is traversed by the equator, is rich in metals. The orang-outang is a native of the forests of Borneo and Sumatra.

Sumatra is crossed, about its middle, by the equator.

Pepper and camphor are its most important products. Bencoolen, which belongs to the Dutch, is the principal European settlement. The isle of Banca, off its eastern coast, has very extensive tin mines.

Java, divided from Sumatra by the Straits of Sunda, is a fertile island, and possesses the trade of nearly all the Archipelago.

Batavia, the chief town, is the capital of the Dutch possessions in the East. Among the interesting products of this island are the sago palm, the pitcher plant, and the upas tree. The edible nests of the sea-swallow are a valuable article of export to China. The island of Sumbawa contains the volcano of Tumbora; the ashes ejected in an eruption of this volcano in 1815, fell to the thickness of eight inches at the east end of Java, 240 miles from the volcano.

Celebes, an island singularly indented by bays, and crossed by the line, is separated from Borneo by the Strait of Macassar.

Philippine Islands; the largest are Luzon and Mindanao; chief town Manilla, whence the Spanish galleon was annually despatched to Acapulco.

The *Moluccas* or spice islands lie between Celebes and New Guinea.

The largest are Gilolo, Ceram, and Booro. Amboyna, near Ceram, is the second in importance of the Dutch settlements.

This group derives its celebrity from its valued productions, cloves, nutmegs, and mace. The clove of commerce is the unexpanded flower of the plant; mace is a covering which envelops the nutmeg.

AUSTRAL ASIA.

New Holland, or *Australia*, is the largest island in the world; it is 2,400 miles long, and nearly 2,000 broad, and it contains 3,000,000 square miles.

Torres Strait separates New Holland from New Guinea, and Bass's Strait from Van Diemen's Land.

Cape York is the most northerly, and Wilson's Promontory the most southerly point.

The Blue Mountains are parallel with the western coast, and divide the eastern and western waters.

The Darling, which runs west, is the largest river yet discovered; its principal tributary is the Murray.

The soil of New Holland is not rich; it is better fitted for a pastoral than an agricultural country.

The most important export is wool, which is increasing rapidly; the southern whale fishery is advantageously prosecuted.

TOWNS.—*Sydney*, on the spacious islet of Port Jackson, is the capital of New Holland, and is a place of great trade.

Hobart Town is the capital of Van Diemen's Land; situated on a most spacious harbour.

The largest quadruped of Australia is the kangaroo, an animal not elsewhere met with; the ornithorynchus or duck-bill is a peculiar animal, having the bill and webbed feet of the duck, a body resembling that of the mole, and the internal formation of a reptile.

New Zealand consists of two large islands, separated by Cook's Strait.

It produces excellent flax, which is exported to Europe. The natives were, till a recent period, cannibals, but the persevering labours of Christian missionaries have produced a most beneficial effect upon them. The principal English settlements are Auckland and Wellington. The whale fishery is extensively prosecuted in Cook's Strait.

Papua or *New Guinea*, *New Britain*, *New Ireland*, *Solomon's Islands*, the *New Hebrides* and *New Caledonia*, are also classed under the title of Austral Asia.

South Victoria, the most southerly land known, was explored in 1842, by Captain Ross, as far as 78° S. lat.

POLYNESIA.

Polynesia (or the "many isles") consists of the following groups and other smaller ones.

1st. The *Ladrone* or *Marianne*, the *Caroline*, and the *Sandwich* islands, north of the equator.

Hawaii (Owhyhee), the largest of the Sandwich isles, is about 100 miles long and 70 broad. Here Captain Cook was killed in 1779.

2d. The *Friendly*, the *Society*, and the *Marquēsas*, south of the equator.

Tahiti (Otaheite) is the largest of the Society group; it was the scene of some of the earliest labours and triumphs of modern missionary exertions. The French have forcibly taken it under their " protection."

Many of these islands seem to be of volcanic origin, others have been formed by the coral insect; several of them contain mountains of considerable elevation. Mount Rosa in Owhyhee is 16,000 feet high. The islands possess a delightful climate and a fertile soil. The principal trees are the cocoa and bread fruit; the yam is a valuable root, but requires care in the cultivation.

AFRICA.

GENERAL VIEW.

Boundaries.—N. by the Mediterranean.—E. by the Red Sea and Indian Ocean.—S. by the Southern Ocean. —W. by the Atlantic.

Extent.—It lies between 37° N. and 35° S. lat., and 18° W. and 51° E. long. Its length is 4,360 miles, and breath 4,036. It contains 12,000,000 square miles. By far the greater part of it lies within the torrid zone.

Coast.—Africa is singularly deficient in bays and minor seas communicating with the ocean. Its western coast exhibits a broad angle, containing the Gulf of Guinea; two bays, the bights of Benin and Biafra, are at the head of this gulf. Delagoa and Sofala Bay are on the east. The Gulf of Syrtis, or Sidra, is on the north.

The western coast of Africa bears the appearance which it would have if wrenched from the opposite coast of America.

The principal headlands are, the promontory on which Tunis stands, (the extreme point of which, Cape Bon, is the most northerly part of Africa,) Point Ceuta, opposite Gibraltar, Cape Verd, the most westerly point, Cape Palmas, Cape Negro, the Cape of Good Hope, and near it Cape Agulhas, the southern extremity, and Cape Guardafui the most easterly point of Africa. The Azore, the Madeira, the Canary, and the Cape Verd islands, are off its western coast; Fernando Po, and the Island of St. Thomas, are in the Bight of Biafra; Ascension and St. Helena Islands lie far off in the bosom of the South Atlantic; the large island of Madagascar is separated from the eastern coast by the channel of Mozambique, and to the east of that island are Bourbon, and the Isle of France or Mauritius.

Face of the Country.—The Atlas mountains, extending from Tunis, parallel with the coast, terminate opposite to the Canary Isles.

They may be said to be continued under the sea to these isles, and thus gives rise to the celebrated Peak of Teneriffe. They reach the region of perpetual congelation, and are about 13,000 feet high. The Peak of Teneriffe is 12,358 feet above the sea.

The Mountains of the Moon stretch across the country parallel with the equator, at from 5° to 10° N. of it.

Other ranges of less elevation are found encircling most parts of the coast, so that Africa, as well as the other continents, is a great table-land.

Deserts of sand cover the greatest part of the surface of Africa. The largest of these is the Sahara, or great desert, which extends over the whole breadth of the land from the Atlantic to the Red Sea, with the exception of the Valley of the Nile.

The sand of these deserts is fine and loose, and is driven along in clouds before every breeze.

Rivers.—The only large rivers of Africa are the Nile, the Senegal, the Gambia, the Niger, and the Congo.

In Asia and America, the mountain ranges, so essential to the rise of rivers, traverse these regions in their extreme length; in Africa the reverse is the case, and many of the streams are lost in the sands before they can reach the sea.

The Nile is formed by two principal streams, the Bahr-el-Abiad, or White River, and the Bahr-el-Azrek, or Blue River. The White River is probably the larger branch; its source has never been discovered, but it is supposed to descend from the Mountains of the Moon. The only tributary which the Nile receives after the junction of these rivers, is the Atbara from Tigre; but it rolls its way with the treasures already received, for upwards of 1,000 miles, through an arid valley, fertilized by its course to the Mediterranean. Of the various channels composing the Delta of the Nile, the Rosetta and Damietta mouths are the only considerable ones.

This was the only river known to the ancients that overflowed its banks, and they were at a loss to account for the phenomenon, which is now known to be occasioned by the rains, that fall so abundantly in the tropical regions where the river has its source.

The swelling of the Nile begins at the summer solstice, and about the autumnal equinox the country in lower Egypt is so inundated as to resemble a great lake; at the approach of the winter solstice the waters gradually retire, leaving the soil enriched by the slime which it has deposited. The length of its course is estimated at 2,300 miles.

The Senegal falls into the Atlantic to the north of Cape Verd, and the Gambia to the south of it.

The Niger, or Joliba, the great object of modern research, rises in the vicinity of the Senegal and Gambia; flowing in a north-east direction, it passes Sego, Jenne, and Timbuctoo; it then flows southward, and after passing Boussa and Eboe, joins the sea on the coast of Calabar, between the bights of Benin and Biafra.

A large fresh water lake has been discovered in central Africa, named Tchad; length about 200 miles, breadth 150: two considerable rivers run into it, the Shary from the south, and the Yeou from the west.

Climate.—Africa has always been noted for its extreme heat; the climate of the central region is, during the rainy season, very prejudicial to the European constitution.

States.—The principal divisions of Africa are, the Barbary States, which comprise Tripoli, Tunis, Algiers, and Morocco; the region of the Nile, which comprises Egypt, Nubia, and Abyssinia; Western, Central, Eastern, and Southern Africa.

Population.—It is impossible to ascertain the population of a country so little explored as Africa; it has been variously estimated at 60 to 100 millions. Its inhabitants belong chiefly to four tribes; the Moors in the north, the Negroes in the middle, and the Kaffirs and Hottentots in the south.

Animals.—The camel has been used in Egypt from the earliest period; hyenas abound in the north; the lion attains his greatest strength in the hot regions of the interior; the giraffe is peculiar to the dry plains of Africa; the elephant and the rhinoceros are hunted for their flesh, their skin, and their ivory, but are not domesticated; the buffalo of the Cape is an animal of great size and ferocity.

The hippopotamus frequents the margins of all the rivers; the zebra, the springbock, and the ostrich, are objects of chase; the chimpanze is found, and powerful baboons and numerous tribes of monkeys abound. The white ants and locusts often commit dreadful ravages.

BARBARY STATES.

Situation.—The northern coast of Africa, between the Mediterranean and the Atlas mountains, and the Atlantic and Egypt, is known by the name of Barbary.

Natural Geography.—Numerous streams descend from the mountains and run into the Mediterranean: those which fall from the southern side are absorbed in the sands. The soil is generally fertile, but is almost entirely uncultivated. The climate is that of southern Europe, the heat being tempered by the mountains and the sea.

Productions and Trade.—Corn and wine might be raised in large quantities; the olive oil of the country is superior; dates form the food of many. The principal manufacture is morocco leather, which is prepared from the skins of goats that abound on the declivities of the Atlas. Some commerce is carried on by means of caravans with the interior. Salt and European manufactures are sent in return for gum, gold-dust, ivory, and slaves.

States.—The States are Tripoli, Tunis, Algiers, and Morocco.

Towns.—Tripoli, the chief seat of the trade with the interior; this city was taken by the crusaders in 1108, when a large and precious collection of Persian and Arabic works was destroyed.

Tunis, the largest city of Barbary; the ruins of Carthage are a little to the east of it. Pop. 100,000.

Algiers, a large, but dirty and incommodious city; it is now the residence of the Governor-General of the French possessions.

Fez, in the northern province of Morocco, of the same name, was once a place of great celebrity, but is now much reduced.

Morocco, once said to contain 700,000 inhabitants; now 70,000.

Mogadore, the only sea-port of Morocco that trades with Europe.

Government, Religion, &c.—The government of these states is an absolute but insecure despotism. The piratical practices of Algiers having more than once excited the attention of Europe, it was at length taken possession of by the French, in whose hands it now is.

The inhabitants are Moors, of a fierce and relentless disposition; they are all bigoted Mahometans.

THE REGION OF THE NILE.

Boundaries.—The countries occupying this region are Egypt, Nubia, and Abyssinia; they have the Red Sea on the E., the desert on the W. and S., and the Mediterranean on the N.

Egypt is divided into Upper, Middle, and Lower, in relation to the stream.

Face of the Country.—Abyssinia is mountainous and well watered. In Nubia, the Nile is hemmed in by high banks and rocks, which restrict the portion capable of cultivation to an extremely narrow belt; in Upper Egypt the valley of the river becomes wider, and in Lower Egypt it becomes an extensive flat, scarcely rising above the level of the sea.

Climate.—The elevation of Abyssinia moderates the heat usual in its latitude, but in the lower regions the heat is frequently excessive. Rain is unknown in Upper Egypt, though on the sea-shore occasional showers fall.

Productions.—Egypt is peculiarly fertile, and has often been the resort of the surrounding nations in times of scarcity., Besides rice and corn, dates and figs are the common objects of culture.

The reed from the pith of which the papyrus of the ancients was made, is still found on the banks of the river.

Commerce.—Egypt is favourably situated for commerce, being placed at the junction of two great continents, and in the immediate vicinity of Europe. After the discovery of the Cape of Good Hope its foreign commerce diminished, but it is now reviving.

The overland mail to India, on its arrival at Alexandria, is forwarded by the canal of Mahomedah to Atfeh, it is thence carried up the Nile in steamers as far as Bulac, the port of Cairo, and is conveyed across the Desert to Suez in carriages. The distance between Cairo and Suez is about 75 miles; it will probably soon be traversed by a railway.

Egypt has a large caravan traffic with the interior: toys and fire-arms are given in exchange for gold-dust, ivory, and slaves. The exports to England are raw cotton, flax, linseed, senna, and gum.

Towns.—Cairo, (*pro.* Ki′ro,) the capital, on the Nile, where it divides to form the Delta. Its distant appearance is striking, but its streets are exceedingly narrow, unpaved, and dusty. Pop. 300,000.

Alexandria stands on a narrow neck of land separating Lake Mareotis from the sea; it was founded by Alexander the Great and constituted by him the capital of Egypt; it was taken by Caliph Omar, A.D. 640, who burnt its library, containing 700,000 volumes on every branch of literature. Cleopatra's Needles and Pompey's Pillar excite attention.

Damietta and Rosetta are sea-ports situated at the principal mouths of the Nile. Aboukir Bay, the scene of Nelson's victory, is between Rosetta and Alexandria.

Girgeh is the nominal capital of Upper Egypt; but Siout is the larger town.

Derr, capital of Nubia; Gondar, of Abyssinia.

Population.—Egypt contains about two millions of inhabitants. The population of the other states cannot be ascertained.

The population of Egypt is composed of Copts, the ancient inhabitants, Turks, its present masters, and Arabs, who form by far the largest portion.

Government.—Egypt is ruled with despotic sway by Mahomed Ali, who revolted from his former master, the Turkish sultan. Nubia and Abyssinia are in a state of anarchy; each tribe asserting its own independence.

Character and Religion.—The Abyssinians are savage; their favourite repast is flesh cut quivering from the ox while yet alive or recently slain. The religion of Egypt is Mahometan. The Copts and Abyssinians profess a species of Christianity mingled with various superstitions.

Animals.—The ichneumon is of great value in destroying the eggs of crocodiles; the ibis is a bird which was held sacred by the ancient Egyptians. Swarms of locusts sometimes infest Egypt and the Barbary States. Hyenas abound in Abyssinia, and lions are found.

Ancient Name.—Egypt is in Scripture denominated Mizraim; Nubia nearly corresponds to the ancient Ethiopia.

Egypt abounds in antiquities. The celebrated pyramids are in the vicinity of Cairo, the largest of them covers eleven acres, and is 460 feet high; the ruins of Memphis, the capital of Egypt under the Pharaohs, are near the same city. The remains of the grandeur of Thebes are scattered over a large surface in the neighbourhood of Luxor, in Upper Egypt.

WESTERN AND CENTRAL AFRICA.

Situation.—With the western coast of Africa, extending from the Senegal in 17° N. lat., to Cape Negro in the same lat. south, Europeans have been long acquainted; but of the interior little is known.

Face of the Country.—Many streams descending from the Mountains of the Moon refresh its torrid climate, and fertilize the soil. Forests of luxurious growth cover large tracts, and in the midst of them the choicest fruits and flowers flourish spontaneously. With the least possible labour, rice, maize, millet, and indigo are raised in abundance. Bees are very numerous.

Commerce.—Gold-dust, ivory, and slaves, are the chief objects of trade; palm oil, teak wood, bees'-wax and gum are exported to Britain.

Provinces.—On the coast are the districts of Senegambia, Guinea, and South Guinea, which embraces the regions on both sides of the Congo. The interior is known by the general name of Soudan or Nigritia.

Senegambia is watered by the Senegal and Gambia. The navigation of the Senegal, at all times difficult, is impracticable above Podor, except in the rainy season. The French have several settlements on he Senegal; the chief is St. Louis.

The Gambia is navigable only in the dry season, (December to June,) owing to the violence of the current when swelled by the rains. The English possess settlements on it; the chief are Fort James and Pisania.

The climate of Senegambia is dreadfully oppressive.

Sierra Leone is a British settlement on the N. of the Guinea coast, which was formed as an asylum for liberated slaves; it is unhealthy. The chief town is Freetown.

Liberia is a colony of free blacks from America.

Next follow the Grain coast, the Ivory coast, the Gold coast, the Slave coast, and the Coast of Calabar.

The most important provinces of the interior are Ashantee, which runs up from the Gold coast, Houssa and Bornou, which lie between the Niger and Lake Tchad.

Of the towns of the interior, Timbuctoo *, Sego, Jenne, and Kano, are among the chief.

Manners and Religion.—The tribes inhabiting the interior of Africa are chiefly negroes; they are a simple and indolent people, their wants are few, and abundance reigns around, yet they are perpetually at war. The tribes on the Calabar coast have been rendered peculiarly savage by intercourse with the slave merchants of Europe. The prevailing religions are the Mahometan and Pagan. The negroes place much dependence on charms.

EASTERN AFRICA AND MADAGASCAR.

Of the *Eastern Coast* from Cape Guardafui to the Tropic of Capricorn little is known. The Portuguese ve settlements upon the coast from Cape Delgado to hambane, but they are not of much value.

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* After many unsuccessful attempts by other travellers, Major Laing, once an usher in the academy of the Author of this work, at length succeeded in reaching Timbuctoo. He resided there some time, but on his return through the desert, was murdered in his tent by order of the *Sheik of Zawat*.

The island of *Madagascar* is about 800 miles long, and 0 broad. It is very mountainous. Tananarivo is nsidered the capital.

The late King Radama abolished the slave trade at the suggestion of English, on condition that twenty of his subjects should be incted by the English. British missionaries were for some time reent in the island, but the present queen being violently opposed to ristianity, they have been compelled to retire.

SOUTHERN AFRICA.

Boundaries.—Southern Africa consists of the colony of e Cape of Good Hope, with the regions extending to e N. and the E. of it as far as discovered.

The northern boundary is undefined; the extreme southerly point ches to nearly 35° S. lat.

Coast.—Africa terminates in a broad point which has veral projecting headlands. The chief are the peninla, called the Cape of Good Hope, which is formed by ble Bay on the N., and False Bay on the S. Cape gulhas is the extreme point of the continent.

Table Bay is exposed to the westerly winds, which prevail during winter months of June, July, and August. At other seasons it is afe and commodious harbour; and during these months, False Bay a safe station for shipping.

St. Helena Bay and Saldana Bay to the N. of Cape Town, are ge harbours, and safe at all seasons; Algoa Bay to the E. contains od anchorage, but is exposed to the prevailing winds.

Face of the Country.—Three successive ridges of mounns run parallel to the coast and each other. On some the summits of the northern range the snow perpetually s. The plains near the sea are fertile, but much of e interior is an arid waste, denominated the Great aroo. The only rivers are the Orange River and the reat Fish River.

Climate.—The climate fluctuates between the two extremes of rain and drought.

Productions.—The feeding of cattle forms the chief occupation of the colonists; corn, wool, wine, hides, and horns, are the principal exports.

Provinces.—Hottentotia is N. of Cape Colony, and Kaffraria E.

Towns.—Cape Town; immediately behind the town, Table Mountain rises precipitously to the height of 3,582 feet; on the one side is the Lion's Head and the other the Devil's Hill.

Constantia, noted for its wine, and Simons Town, dependent upon its docks, are beside Cape Town.

Manners, &c.—Cape Colony was founded by the Dutch, and was long in their possession; a great portion of the population is still Dutch; the boors or farmers are extremely indolent. The Hottentots, the original inhabitants, were enslaved by the early settlers, but British justice has recently been extended to them. Bushmen, a tribe of unsubdued Hottentots, occupy Hottentotia. The Kaffirs are a wandering and warlike tribe.

AMERICA.

GENERAL VIEW.

Boundaries.—N. by the Polar Sea.—E. by the Atlantic.—S. by the Antarctic; and W. by the Pacific Ocean.

Whether Greenland and the land north of Barrow's Strait are united to America, is yet unknown; it is probable that they are not.

Extent.—America lies between 75° N. and 56° S. lat., and 35° and 168° W. long.

Coast.—Whilst the Old World stretches in its greatest length from east to west, the New reaches from north to south. America consists of two distinct portions linked together by the Isthmus of Panama or Darien; these are called North and South America.

The boldest headlands are, Cape Farewell, the southern extremity of Greenland; Cape Charles, in Labrador; Cape St. Roque, in Brazil; and Cape Horn, the most utherly point of America. The western coast is com- ratively unbroken.

Islands.—Melville Island is in the Polar Sea, Newfound- nd is opposite to the Gulf of St. Lawrence, the West dia Islands occupy the chasm between North and South merica, the Falkland Islands and Terra del Fuego are the southern extremity of the continent; New South hetland, still further to the south, is crossed by the ntarctic circle; on the north-west are the Aleutian lands, a semicircular group, forming a connecting link etween the Old World and the New.

Seas.—The waters of the ocean occupying the channel etween Cape Farewell, the southern point of Greenland, nd Labrador are, in their progress northward, divided to two branches; Davis's Strait, leading to Baffin's ay, and the other, Hudson's Strait, which forms the en- ance into Hudson's Bay.

Lancaster's Sound, an opening on the west of Baffin's Bay, and mis- ken by the early navigators for a mere inlet, leads through Barrow's traits to the Polar Sea, visited by Parry in 1820.

The Gulf of Mexico, which is traversed by the Tropic f Cancer, is nearly shut out from the ocean by the eninsulas of Florida and Yucatan. The Caribbean Sea formed by the islands of Cuba, Domingo, Porto Rico, nd the Caribbee Islands.

Mountains.—America is traversed from north to south y a range of mountains, the longest in the world, and ome of the summits of which were long esteemed the ftiest. This chain, which in both continents keeps to he western side, is in North America called the Rocky ountains, and in South, the Andes.

On the east of North America the Apalachian or Al'- eghany mountains, a long but less elevated range, run arallel with the coast from the Gulf of St. Lawrence to he Gulf of Mexico; and in S. America, another range ivides the maritime from the inland portion of Brazil.

The regions between the eastern and western chains in both continents form plains of prodigious extent, which are distinguished by their fertility from the dreary deserts of Asia and Africa.

The principal table-land is that which covers Mexico, and is formed by the approach of the two ranges of mountains; its elevation is about 6,000 feet.

Lakes.—North America contains a series of lakes, which exceed in size those of any other part of the world; taking them in order from north to south, they are the Great Bear Lake, Slave Lake, Athabasca, Winnipeg, Superior, Michigan, Huron, Erie, and Ontario.

Rivers.—The Mackenzie and Coppermine flow into the Northern Ocean. The St. Lawrence issues from Lake Ontario, and carries to the North Atlantic the waters of the great lakes; its principal tributary is the Ottawa. The greatest river of North America is the Mississippi, the channel by which all the waters falling between the Rocky Mountains and the Alleghany find an exit. The main stream, though it is deprived of this name, is the Missouri, which rises in the Rocky Mountains; the Ohio is the principal tributary from the east. The course of the Mississippi from the source of the Missouri to the Gulf of Mexico, into which it falls, is about 4,200 miles.

The Mississippi (or "Father of Waters") is, before its junction with the Missouri, a clear and beautiful stream. The Missouri (or "Mud River") is turbid and impetuous. The Ohio is a "fair river." Immense quantities of drift-timber are carried to the sea by the Mississippi, and it often, by the force of its current, washes away its banks. It is subject to periodical inundations, the greatest of which takes place about Midsummer. The country at its mouth is for many miles a dreary swamp.

The Columbia flows from the western side of the Stony Mountains into the Pacific.

The Amazon or Maranon, probably the largest river in the world, rises from the eastern flank of the Andes, and traverses, before reaching the ocean, nearly the whole breadth of the continent. Its principal tributaries are the Negro from the north, and the Madeira from the south. Its length is about 4,700 miles; at its mouth it is 180 miles in width.

The La Plata is formed of the rivers Paraguay and Parana; its waters are directed in a southerly course by the Brazilian mountains, and it joins the sea by a large estuary, below Buenos Ayres.

Climate.—The great extent of land in North America gives it a climate tending to extremes; its summers are hotter and its winters colder than in the same latitudes in Europe. The narrowness of the central region, (forming a complete contrast to Africa,) with the great elevation of country, renders the climate temperate. The southern extremity is cold and moist.

States.—North America is divided into the British Possessions, Russian America, the United States, Texas, Mexico, California, and the disputed Oregon territory.

Guatimala occupies the isthmus connecting the continents.

South America consists of Colombia, Guayana, Peru, Brazil, Upper Peru or Bolivia, Paraguay, Chili, La Plata, Uruguay or Banda Oriental, and Patagonia.

Population.—About forty-seven millions.

Before the northern coasts of America were explored, it was difficult to account for the manner in which its inhabitants had emigrated from Asia, the cradle of the human race. Now the problem is easy; the passage across Bhering's Strait is practicable in the rudest canoe, or even on a piece of broken ice, and in winter the strait is probably frozen over. The progenitors of nearly all the native tribes of America, are therefore supposed to have emigrated from the north-east of Asia. The Esquimaux, inhabiting the north-east parts of the continent, differ in appearance from the other tribes, while they have a resemblance to the northern Europeans; they were probably derived from the northern coasts of Norway. A great part of the native inhabitants have been exterminated by the unparalleled cruelties of the early Spanish and Portuguese settlers. European diseases, and the introduction of intoxicating liquors, have also destroyed great numbers; others still roam in savage freedom through their forests, whilst a few tribes have embraced Christianity, and have adopted European civilization.

Another portion of the population of America and its islands consists of Africans, or the descendants of Africans, who have been torn from their native land to toil in slavery, in room of the extirpated native Indians. Many of these are still in bondage, and those who are emancipated are not admitted to most of the rights of citizenship and the privileges of general society.

The remaining part of the population of America is of European origin, chiefly Spanish and British.

Productions.—The mineral riches of America are great. The chief supplies of gold and silver are drawn from the mines of Mexico and Peru. Chili and Cuba have some of the richest copper mines in the world. Europe is chiefly dependent on Brazil for its supply of diamonds. The forests yield immense supplies of timber. Europe is indebted to America for the potato, and this is the native region of the tobacco plant, which has been diffused from one extremity of the Old World to the other.

Animals.—The same animals occur in the northern parts of America as in the same situation on the other continents, as the black bear, the white bear, the rein-deer, the elk, the beaver, &c.; the grisly bear, the most ferocious of his tribe, is, however, peculiar to America. The bison, or American ox, is found on the prairie lands of the Rocky Mountains. On proceeding southward, the animals become of a totally different character from those of the Old World. The larger animals, as the elephant and hippopotamus, are not found; and before European intercourse, the horse and other domestic quadrupeds were not met with, but they now range in immense herds over the plains of South America. The jaguar nearly equals the Asiatic tiger in size and ferocity; the puma is often, though improperly, called the American lion. All the monkey tribes differ from those of Asia and Africa, and some of them are remarkable for the prehensile power of their tail. The condor of the Andes is the most powerful of the feathered tribes. The woods both of N. and S. America are the resort of vast flocks of wild turkeys and pigeons. The vampire, a species of large bat, which lives upon blood that it sucks from man and animals during sleep, occurs. Among the reptiles, which are numerous, the boa constrictor and the rattle-snake are exclusively American.

BRITISH AMERICA.

Boundaries.—The whole of America lying between the two oceans, and extending from the United States on the S. to the extreme point of discovery in the N., is claimed by Britain, with the exception of the peninsula on the north-west, which is grasped by the Russians.

The boundary between the United States and British America begins at Passamaquady Bay, (which joins the Bay of Fundy,) it then runs by an artificial and irregular line to the St. Lawrence, which it joins in lat. 45° N., the Great Lakes then form the division, after which an artificial line, extending along the 49th degree of lat., carries the boundary to the Rocky Mountains.

Coast.—The Gulf of St. Lawrence extends from 45° to 51° lat. The islands of Newfoundland and Cape Breton lie at its mouth. The Strait of Belle Isle separates Newfoundland from Labrador, but the principal entrance to the gulf is between Newfoundland and Cape Breton. The peninsula of Nova Scotia forms the Bay of Fundy.

Lakes.—Lake Superior is 380 miles long and 180 broad. Lake Huron contains a number of islands, and is 218 miles by 180. Lake Michigan stretches southward into the United States territory. The river St. Clair connects these lakes with the Erie, and their superfluous waters then find their way by the channel of the Niagara to Lake Ontario, in the course of which they are precipitated in one tremendous plunge over a fall of 160 feet. Lake Ontario, the most easterly of the great lakes, is 180 miles long and 50 in breadth. Its shores are inhabited by a comparatively dense population, and numerous steam vessels constantly ply between the British side and the United States.

These lakes are very deep, in some places 900 feet, and their waters are clear and transparent.

Climate.—Upper Canada for six, and Lower Canada for five months in the year, have a mean temperature below the freezing point, and are buried in perpetual snow; after that period, without the intervention of a spring, the sun breaks out with great force. The winters of Nova Scotia and New Brunswick are less severe, but heavy fogs prevail. The navigation of the St. Lawrence is blocked up for half the year by ice.

Produce and Trade.—Canada, especially the lower province, has many districts peculiarly fertile, and well adapted to the growth of corn; but the greatest portion of the country is covered with immense forests. The articles exported principally consist of timber, grain, furs, dried fish, fish-oil, turpentine, and pearl-ashes. The imports consist of woollens, cottons, and linens; earthenware, hardware, tea, sugar, and coffee; wine, brandy and rum; coal, &c.

Of furs, the beaver's is the one exported to the greatest amount and value, but the animal is now scarce on this side the Rocky Mountains. The cod fishery on the banks of Newfoundland has long been carried on to an almost unlimited extent; the hunting of seals is now becoming a trade of great importance to the settlers on that island.

Provinces.—Canada, New Brunswick, Nova Scotia, and the Hudson's Bay territories.

Canada was formerly divided into two provinces, called the *upper* and *lower*, in relation to the river. They are now united.

Towns.—Kingston, on the east coast of Ontario, was the naval arsenal during the American war, and has recently been constituted the legislative capital of Canada. It has an excellent harbour and is strongly fortified.

Quebec is situated on the St. Lawrence, about 340 miles from its mouth; and is strongly fortified. General Wolfe fell in taking Quebec in 1759. Its commerce is considerable, and has been greatly increased by the facilities furnished by steam-boats for intercourse with Montreal, Halifax, &c. Population 30,000.

Montreal, on the St. Lawrence, where the Ottawa joins it: the centre of the fur trade and of the commerce between Canada and the United States. Large vessels cannot ascend the river so far, owing to its expanding into the Lake St. Peter, and becoming shallow.

Toronto, formerly called York, is on the N.W. coast of Lake Ontario. Halifax, capital of Nova Scotia; the chief export is fish.

Population.—One million and upwards; it is rapidly increasing by emigration from Great Britain.

In Lower Canada a great portion of the inhabitants are of French extraction; the French language and manners prevail, and the Roman Catholic religion is generally professed. The rest of the population is chiefly of British origin, who are for the most part Protestants.

Government.—A constitution formed on the model of Britain is enjoyed by British America.

The legislature consists of the governor, a council, and a house of assembly. The council corresponds to the British House of Lords, and consists of members chosen by the governor for life; the assembly, corresponding to the House of Commons, is composed of the representatives of the people, chosen for four years. Any bill passed by the two houses, and obtaining the consent of the governor, becomes law if the king of England does not negative it, which he may do any time within two years after receiving it.

UNITED STATES.

Boundaries.—The United States claim the whole of America from ocean to ocean, between the British possessions on the north, and Mexico and the gulf of Mexico on the south; but all west of 94° W. long. is nearly unoccupied territory.

Rivers.—The rivers unconnected with the Mississippi are,—the Hudson, which, rising near Lake Champlain, flows by Albany and New York; the Delaware by Philadelphia, expands into Delaware Bay; the Susquehana by Harrisburg, and the Potomac by Washington, run into Chesapeake Bay. The Catahouche and the Alabama flow into the Gulf of Mexico.

Canals.—The Delaware and Hudson rivers are joined by a canal, 108 miles long. A canal unites the Hudson with Lake Champlain, thus opening a direct communication with Canada. Another, 363 miles long, runs from the Hudson at Albany to Lake Erie, and the Ohio canal, springing out of Lake Erie, at Cleveland, continues the navigation to the river Ohio, and completes the water communication between the States of the interior and both the extremities.

One extends from Cincinnati to the western end of Lake Erie.

Another unites the Potomac at Washington with the Ohio at Pittsburgh. It is 360 miles long, and has a tunnel, four miles in length, to carry it through the mountains. The aggregate length of the canals in the United States is nearly 4,000 miles.

Railways.—Nearly 5,000 miles of railway have been laid down, or are in progress. A line runs from Boston to Buffalo, near the falls of Niagara. A series of lines runs from New York to Wilmington in S. Carolina, taking the important cities of Philadelphia, Washington, and Richmond in its course.

Commerce.—The commerce of the United States has attained an amazing magnitude; there is no part of the globe which is not visited by American merchantmen. The principal exports are cotton, tobacco, flour, and rice: the imports are exceedingly various, and consist of all the necessaries and luxuries of life not easily procured in the country itself.

Though cotton is now the staple production of the States, not a pound weight of it was sent out of the country before 1790. The best is grown on small sandy islands contiguous to the shores of Georgia and Carolina, or on low grounds along the sea. Tobacco is chiefly cultivated in Virginia and Maryland. The rice raised on the low marshy ground of Carolina is superior to any other.

Provinces.—There are 26 States in the Union, besides 3 territories, and 1 federal district.

1st. The six northern States; Maine, New Hampshire, Vermont, Massachūsetts, Connecticut, and Rhode Island.

These States are to the east of the Hudson, and constitute New England; in point of soil they are the least fertile, but they were the earliest settled, and are the most commercial, the most thickly peopled, and the most intelligent portion of the Union.

2d. The four in the Middle; New York, Pennsylvania, New Jersey, and Delaware.

In these States the agricultural character is united with the commercial; they contain the greatest extent of cultivated land, and the largest and most prosperous cities.

The six Southern ; Maryland, Virginia, North Ca-
South Carolina, Georgia, and Alabama.

habitants are chiefly planters, and slave labour is employed.
ivation of rice, cotton, and tobacco here takes the place of the
objects of agriculture.

The Western States, ten in number, are,—Ohio,
an, Indiana, Illinois, Kentucky, Missouri, Ten-
Arkansas, Mississippi, and Louisiana.

States excite interest, not so much for what they are as for
y will be ; the tide of emigration has set in strongly, not only
rope but from the Eastern States of the Union.

district of Columbia has been separated from Vir-
nd Maryland, and is under the jurisdiction of the
e legislature of the Union alone.

territories not yet erected into States are Florida,
sin, and Iowa.

—Washington, in Columbia, on the Potomac, the official capital
Union ; it consists at present of detached clusters of houses
but it will, when complete, be a magnificent city. The capitol,
ich Congress meets, is the noblest building in the Union.
t Vernon, the seat of General Washington, is about 15 miles
the city. Pop. 23,000.

ork, the commercial capital of the States, is situated on the
of Manhattan, at the mouth of the Hudson. It is protected
the swell of the Atlantic by Long Island, which forms the chan-
lled the Sound or East River ; here the united navies of the
might ride. New York possesses half of the import trade of
nited States, and has a greater amount of tonnage than any
city except London. Pop. 313,000.

lphia, Pennsylvania, in population the second, but in manufac-
the first city of the Union. Printing is carried on to a great
t. Though in lat. 39° 57′ N., its harbour is occasionally shut
r a few weeks in the winter by ice. Pop. 229,000.

re, Maryland, near the head of Chesapeake Bay ; 70 years ago
a village, now it contains a population of upwards of 103,000.

rleans, Louisiana ; on the Mississippi, about 105 miles from its
h, enjoying a greater internal navigation than any other city in
orld. The invention of the steam-boat has added greatly to its
erity. The town is unhealthy. Pop. 102,000.

, Massachusetts. Formerly the commercial and still the literary capital of the States; the revolution commenced here; place of Franklin. Pop. 93,000.

Pittsburg, Pennsylvania; called from its extensive iron work mingham of America; it suffered severely from fire in 18

Cincinnati, Ohio; called from the beauty of its situation the the West; extensive manufactures. Pop. 46,000.

Albany, the capital of the State of New York. Pop. 34,00

Charlestown, South Carolina; a considerable commercial to unhealthy.

Louisville, Kentucky, on the r. Ohio, near the rapids.

Providence, capital of Rhode Island, the second city of New in population and commerce.

Lowell, Massachusetts; next to Pittsburg the most import facturing town in the Union; it has extensive cotton man

Newhaven, Connecticut; Yale college, which has its seat he of the most distinguished literary institutions of America.

Population.—Upwards of 17 millions.

Government.—The government is a federal rep

Each state is independent of the others, and has a separa ture for the management of its internal concerns; but the d the country, the regulation of the commerce, and the unite of the Union, are entrusted to a general government. The is at the head of the legislature; he is chosen for four years b selected for the purpose from each state. The Congress, co ing to the British houses of Parliament, consists of a Sen House of Representatives. The Senate is composed of two chosen from each state by the State legislature; the House sentatives consists of members elected by the people for two representative is allowed for every 40,000 inhabitants.

Although the constitution of the United States is founded maxim "that all men are created equal, that they are endowe Creator with certain and inalienable rights, that among the liberty, and the pursuit of happiness," slavery is sanctioned by gress in the district of Columbia, which is entirely under their trol, and nearly three millions of human beings toil in bonda ferent States of the Union.

Religion.—There is no national religion or esta Church, the great bulk of the people, however, Christianity in some of its forms.

The clergy of all sects are supported by voluntary contributi most numerous denominations are in the order stated, Bapt *thodists*, *Presbyterians*, Congregationalists, Catholics, and Episc

Great attention is paid to education by the legislature, and whites may every where procure free instruction. There are 173 colleges in the Union, the principal are Harvard University, in Massachusetts, and Yale College.

Character.—The Americans are an active and enterprising people. Party spirit runs very high among them, and it is to be feared that the popular voice is not under sufficient control.

MEXICO AND MINOR STATES.

That portion of North America which is to the S. of the United States, having the Gulf of Mexico on the E. and the Pacific on the W., formerly constituted the republic of Mexico. It now consists of the States of California, Texas, Mexico, Guatimala, and Yucatan.

Government.—The government of all these States is republican, but most of them are in an unsettled state. The Roman Catholic religion is generally professed.

At the arrival of the Spaniards, Mexico was the most powerful and populous empire of the New World. The people had made some progress in civilization, and recorded events by paintings of a peculiar character, little inferior to the hieroglyphics of Egypt. Fire-arms gave Cortez the advantage over the native Mexicans, and they were nearly exterminated. A mixed race sprung up, who were carefully excluded by the Spanish court from any share of the government. In 1810 a revolutionary struggle commenced; the contest was long and bloody, but the Mexicans at length succeeded in throwing off the Spanish yoke. In 1835 Texas declared itself independent of Mexico, and has since been annexed to the United States; in 1836 California revolted.

Face of the Country.—The greater part of this region consists of vast plains, varying from 6000 to 8000 feet above the level of the sea; from this base groups of volcanic mountains rise to the height of 14,000 or 18,000 feet, the summits of which are covered with perpetual snow. The largest rivers are the Rio Bravo del Norte,

which separates Texas from Mexico, and the Rio C
do, which is in California.

Productions.—Fertile but unhealthy tracts of lan
der the ocean, which are clothed with the richest tr
vegetation, and produce sugar, indigo, and cotton
the chief wealth of Mexico consists in its mines.

Gold is not procured in large quantities; but the annual pr
silver is ten times as much as is furnished by all the mines of
Mexico has provided the gardens of Europe with many beautif
ers, especially the dahlia. It supplies the market of the world
cochineal insect, so valuable as a scarlet dye.

Towns.—Mexico, the most splendid city in the New World
near the lake Tezcuco. Pop. about 150,000.

Vera Cruz, on the Gulf of Mexico, the principal sea-port of
is an unhealthy and disagreeable town.

Acapulco, on the Pacific, has a magnificent harbour, but no tra

Zalapa, or Jalapa, near Vera Cruz, a handsome town; famous
drug to which it gives name.

Queretaro is a considerable city of Mexico.

Houston, Texas, a place of great and increasing trade.

Britain possesses the settlement of Honduras,
lies between Guatimala and Yucatan, and is wash
the bay of Honduras. England hence derives her
supplies of mahogany.

SOUTH AMERICA.

Colombia, consisting of the three states, New G
da, Venezue'la, and Equator, is in the north-west.

The isthmus of Darien, or Panama, which joins it to Guati
30 miles across.

In Mount Chimborazo the Andes attain the hei
21,440 feet.

Its top has never been reached; Humboldt got to within 2
of it.

Cotopaxi, the most remarkable volcano in the early 19,000 feet high. The river Orinoco (*pro.* nōōco) waters this region; after a course of 1,800 s, it enters the Atlantic by about fifty mouths.

chain of mountains, branching off from the Andes to Point Paria, osite Trinidad,) forms the northern boundary of the basin of the oco; another range on the south, called the Sierra Pacaraino, rses the country from west to east, separating the waters of the oco from those of the Amazon.

nese rivers are united by the natural channel of the Cassiquiare, h joins the Rio Negro, an affluent of the Amazon.

he soil of Colombia is singularly fertile, and owing to elevation, its climate, though equatorial, is delight- Gold, and many other metals, and precious stones, found. Noxious reptiles are very abundant, and hquakes are not unfrequent.

ns.—Bogota, the capital of Granada; nearly half the city consists ecclesiastical buildings.

to, (*pro.* Kee'to,) lying under the equator at an elevation of 9000 et above the level of the sea; possesses a genial climate. Owing the vicinity of the volcanic mountain Pichincha it is exposed earthquakes. Pop. 70,000.

yaquil is one of the principal sea-ports of South America; its dock- rd is extensive.

accas, the capital of Venezuela, was nearly destroyed in 1812 by earthquake,—12,000 persons perished. This circumstance oc- rring in the same year in which the people revolted from Spain, as regarded as a token of Divine displeasure, and gave a temporary eck to the revolutionary movement.

olombia early resisted the tyranny of Spain, and in 1 achieved its independence under Bolivar.

he Caribbee Indians, a very fierce tribe, occupy the interior of this itory. They are tall and of a reddish copper colour.

he Roman Catholic religion is generally professed oughout the whole of South America, the ceremonies l processions of which are observed with much pomp. ncing and bull fighting are the favourite amusements.

lere, as throughout all South America, they practise the *lasso*, a le of catching cattle by a noose skilfully thrown over the animal n in full chase.

The principal exports from all the South American States, are tallow and hides, for the sake of which alone the wild animals are slain in immense numbers. For manufactured goods, South America is dependent upon Europe,—the chief imports are cotton and woollen goods.

ENGLISH GUAYANA, DUTCH GUAYANA, and FRENCH GUAYANA occupy the north-east of the continent.

The coast is low and lined with marshy islands and mud banks, which bar the mouths of the rivers. The soil is very rich but the climate is unhealthy. The country is still for the most part covered with forests, which abound in trees of great size. Among the tenants of the wilderness, are the sloth, the bell-bird, and the goat-sucker. The Indians in shooting birds use a blow-pipe and arrows tipped with the Wourali poison. The cayman or alligator is found in all the large rivers.

British Guayana, which was taken from the Dutch, contains the important settlements of Demerara, Essequibo, and Berbice (*pro.* Berbēce). The chief towns are Georgetown and New Amsterdam.

Dutch Guayana contains the colony of Surinam, the chief town of which is Paramaribo.

Cayenne is the chief town in the French territory.

PERU occupies the middle of the western coast: it has recently been divided into two separate republics, called Peru and Bolivia. It is intersected by the Andes, which here attain their greatest elevation.

The mountain of Sorata is said to be 25,400, and Illimani 24,350 feet in height; thus exceeding Chimborazo, which was long esteemed the highest in the world.

Peru, which is proverbial for its riches, abounds in the ores of silver and quicksilver. The silver mines are situated in the heart of the Andes, about the limits of perpetual snow; those of Potosi are the richest known.

The lama, a species of small camel, and the condor eagle, are the most interesting of its living productions.

Towns.—Lima, the capital of Peru, is situated on the Rimac in a delightful valley at the distance of six miles from the Pacific. The city was founded by Pizarro, and its fine cathedral contains his tomb. Pop. about 60,000.

Cuzco, formerly the capital of the empire of the incas; it retains traces of its ancient architectural grandeur. Its inhabitants are chiefly Indians. Pop. 40,000.

Potosi, Bolivia, famous for its silver mines. It stands 13,000 feet above the sea, and is probably the highest city in the world. It was once very populous, but is now nearly deserted.

Chuquisaca is the capital of Bolivia, or Upper Peru.

Truxillo, Peru, is a fine sea-port, 300 miles north-west of Lima.

BRAZIL lies on the east of South America, and occupies nearly half of that continent.

Brazil was first visited by Amerigo Vespucci, a Florentine, whose name is supposed to have given rise to the designation of the New World. Brazil takes its name from the dye-wood, which was known in Europe long before the discovery of America.

Besides the Amazon, the Francisco is a Brazilian river.

The soil of Brazil is rich, but a great portion of the country is covered with dense forests.

Diamonds form the chief of its mineral treasures, nearly all at present in Europe having been supplied from Brazil; gold and other metals increase its wealth.

Brazil-wood, used in dyeing, rose-wood, the cocoa plant, and several medicinal plants, abound. It exports a considerable quantity of sugar, coffee, and cotton-wool, also tallow, hides, horns, and bones.

Towns.—Rio-de-Janeiro, the largest and most flourishing city of S. America, is situated on a bay above 60 miles in circumference, studded with islands and opening to the Atlantic by a deep entrance about a mile wide. The trade of Rio is chiefly carried on by British merchants. Pop. 140,000.

Bahia, or St. Salvador, formerly the capital of Brazil, is situated on the magnificent bay of All Saints, capable of containing all the navies in the world. Of the imports into Bahia, slaves, notwithstanding the nominal suppression of the trade, continue to be the most important article. Pop. 130,000.

Pernambuco has considerable trade. Pop. 60,000.

Government.—Brazil, formerly a colony of Portugal, is now an independent state. The government is a limited monarchy, the emperor is a prince of the Portuguese royal family. Three-fifths of the population are slaves.

CHILI lies between the Andes and the Pacific.

Its rivers are short, and too impetuous for the purposes of navigation. It is peculiarly subject to earthquakes. Of its mines, those of copper are the most valuable.

The chief towns are Santiago, and its sea-port, Valparaiso. The island of Juan Fernandez, the residence of Alexander Selkirk, is off the coast of Chili.

LA PLATA lies between Chili and the Atlantic.

The plant yielding the gum caoutchouc, or Indian rubber, flourishes here.

Buenos Ayres, on the river La Plata, about 200 miles from its junction with the sea, is the chief town.

The mouth of the La Plata is so obstructed with shoals that vessels cannot approach within two or three leagues of the town. Buenos Ayres was so called from the supposed salubrity of its air.

PARAGUAY is a small independent territory on the south-west of Brazil, of which Doctor Francia, a private adventurer, was in absolute possession until his death, which took place recently.

This country produces a kind of tea called *matè*, which is in as general demand throughout La Plata, Chili, and many parts of Peru, as the teas of China are in Europe.

BANDA ORIENTAL is situated between the river Uruguay and the Atlantic, and extends along the northern shore of the Plata. It was declared an independent State in 1829. Monte Video, its capital, has an excellent harbour.

PATAGONIA, occupying the southern portion of South America, is in possession of native tribes, who are represented as being in person taller than the ordinary standard. The insular portion, separated from the continent by Magellan's Straits, was called Terra del Fuego, the land of fire, from the supposed prevalence of volcanoes.

The total population of South America is estimated at fifteen millions.

WEST INDIES.

The West India Islands are between N. and S. America. There are five large and about forty smaller islands, besides numerous rocky islets. They are usually classed in three groups; the Bahama islands, the Great Antilles, and the Less Antilles or Caribbee islands.

The West Indies were discovered by Columbus in his celebrated voyage in search of India. Supposing that he had reached that continent by a western route, he denominated them the West Indies.

The islands are mountainous and abrupt, looking like the summits of a submerged continent towering above the ocean. They are generally well watered, but the streams are short and rapid.

All the islands, except some of the Bahamas, are within the tropics. The seasons consist of wet and dry. The spring rains set in about the middle of May. They are comparatively slight and of short continuance. From the beginning of June to the end of September summer reigns in all its power. In October the rainy season again sets in, when the clouds seem to fall in cataracts. In December the weather again clears, when a comparatively cool and refreshing season is enjoyed.

Most of the islands are subject to dreadful hurricanes between the months of July and October.

The oppressive heat of the dry season is tempered by the sea breeze, which sets in about 10 A.M., and continues till late in the evening, when the land breeze, after a short interval, succeeds.

The nights are peculiarly bright and the dews heavy.

The Bahama or Lucayos Islands extend in line from the coast of Florida to near Hayti. They belong to Britain.

The principal island is New Providence. San Salvador was the first land seen by Columbus on his first voyage, October 12th, 1492.

The Great Antilles are Cuba and Porto-Rico, belonging to Spain; Hayti, an independent state; and Jamaica, belonging to the English.

Cuba is 790 miles long, and about 70 broad; it is as large as all the other islands put together. It occupies an important position, commanding the entrance into the Gulf of Mexico; for a long time it was neglected by Spain, but since the loss of its American colonies it has risen into much importance. The great bulk of the population consists of slaves in the lowest state of degradation; about 70,000 are annually imported to supply the waste of them. Havannah, its capital, is a very flourishing town.

Hayti, also called Hispaniola, and St. Domingo, was formerly occupied by the Spaniards and the French. The French had the western and more fertile districts. During the French revolution, while the free blacks were at open war with the whites for equal liberties with them, the slaves conceived the idea of procuring their own freedom; scenes of blood and devastation ensued, but the cause of freedom triumphed. The government is nominally republican, but actually a military monarchy. White people, of whatever nation, are prohibited by the constitution from acquiring or exercising any right of property or mastership in the island. Its soil is very fertile, and before the revolution it produced great quantities of sugar and coffee.

The chief towns are St. Domingo and Port-au-Prince.

It produces superior mahogany, which is exported to England under the name of Spanish mahogany.

Jamaica is the most valuable of the British possessions; it is not naturally very fertile, but is well cultivated. It is 150 miles long with an average breadth of 40. The Blue mountains of the interior are about 7000 feet high. Its former capital, Port Royal, has been thrice destroyed -- by earthquake, by fire, and by hurricane. Kingston is now the chief town.

The Less Antilles or Caribbee Islands, form a long chain, extending in a curved line from Porto-Rico to the Gulf of Paria. The most northerly part of this group is called the Leeward Islands, the southerly portion the Windward islands.

Of these the greater part of the Virgin Isles, Barbuda, St. Christopher's, Antigua, Dominica, St. Lucia, St. Vincent, Barbadoes, Grenāda, Tobago, and Trinidad, with some smaller islands, belong to the British.

St. Vincent is the most beautiful of the Windward islands; it contains an active volcano.

Grenada has been styled the gem of the ocean; it is mountainous but picturesque.

Barbadoes, the oldest and most improved of the British possessions in the West Indies, is the most easterly of the Windward Isles, and lies considerably out from their line. Hurricanes are frequent and violent.

Trinidad contains a pitch lake and some active mud volcanoes.

Martinique and Guadaloupe belong to France; St. Croix, St. Thomas, and St. John, to Denmark; St. Bartholomew belongs to Sweden; and St. Eustatius and Curaçoa, to Holland.

The Bermudas, or Somer's Islands, situated half way between Nova Scotia and the West Indies, belong to the English. They are important as a naval station.

From the West India Islands are procured sugar, rum, cotton, indigo, cocoa, coffee, mahogany, pepper, ginger, arrow-root, &c.

Formerly the labourers in the plantations were African slaves. The slave trade was abolished in 1807, and in 1833 the British Parliament passed an Act by which slavery was abolished in all British colonies.

QUESTIONS FOR EXAMINATION.

The arrangement being uniform, the same system of examination may be pursued with the other continents as with Europe.

PART II.

CONTAINING PROBLEMS ON THE TERRESTRIAL GLOBE.

DEFINITIONS.

1. THE *terrestrial globe* is a representation of the earth on a globular surface, showing the relative situations of the places upon it.

2. A *map* is a representation of the earth, or of a part of it, upon a plane surface.

3. The *axis* of the earth is an imaginary line passing through its centre, round which it turns from west to east, once in 24 hours.

This is represented in globes by the wire which passes through them, and on which they turn.

4. The *poles* are the two ends of the axis: one is called the *north*, and the other the *south*, pole.

5. The *equator* is that line supposed to be drawn round the middle of the earth, at an equal distance from both poles: it divides the earth into two equal portions, called the *northern* and *southern hemispheres*.

The equator, when referred to the heavens, is called the *equinoctial:* it is sometimes called the *line*, or *equinoctial line*.

6. *Meridians* are lines drawn from one pole to the other, directly across the equator.

They are so called, because when any of them is, by the motion of the earth, brought directly opposite to the sun, it is mid-day (*meridies*) there.

As each place is in succession presented to the sun, the meridians must be considered as indefinite in number. Not to obscure the surface, they are usually drawn only through every five or ten degrees. On maps they always run from top to bottom.

The brass circle in which the globe hangs, and which is called the *brazen meridian*, may be made to represent the meridian of any place. It is divided into four parts, of 90° each [*]. On one semicircle the degrees are numbered from the equator towards the poles; on the other from the poles to the equator. The former is used in finding the latitude of places, the latter in elevating the globe.

7. *Latitude* is the distance of any place, north or south, from the equator.

The latitude of a place can never exceed 90°, that being the distance of the poles from the equator. It is reckoned by degrees and minutes on the brass meridian, but in maps at the sides.

8. The *longitude* of a place is the distance of the meridian of that place, east or west, from the first meridian.

On globes it is reckoned on the equator; but in maps, at the top or bottom. Geographers in different countries have fixed upon different places for the *first meridian*. The Dutch have fixed upon the Peak of Teneriffe; and the French on the island of Ferro, one of the Canaries. The English reckon from the meridian of Greenwich. The greatest longitude any place can have is 180°, or half the circumference of the globe.

9. *Parallels of latitude* are circles drawn parallel to the equator.

The circles on the globe drawn to represent the parallels of latitude become smaller the further they are distant from the equator; that representing the parallel of 60°, is only half the size of the equator. In all maps they are the lines drawn from one side to the other.

SECTION I.

PROBLEM I.

To find the Latitude and Longitude of any place.

By the Globe.—Bring the given place to the brass meridian; then the degree of the meridian directly over it shows the latitude, and the degree of the equator under the meridian shows the longitude.

By Maps.—Ascertain with a pair of compasses the distance from then earest parallel and meridian when these are not drawn through the place, and at one side and at the top or bottom of the map the degree of latitude and longitude will be found.

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[*] Every circle is, by geometers, divided into 360 degrees.

To distinguish East from West Longitude.

Rule.—If the figures increase towards the right hand, the longitude is *east;* if towards the left, it is *west.*

EXAMPLES.

1. Required the latitude and longitude of Edinburgh.

Bring Edinburgh below the meridian, we find, over it nearly, the 56th degree of North latitude, (55° 58′,) and the point where the meridian cuts the equator is nearly 3¼ (3° 12′) degrees west of London.

Required the latitude and longitude of the following capital cities of Europe.

2 London
3 Copenhagen
4 Stockholm
5 Petersburgh
6 Paris
7 Amsterdam
8 Vienna
9 Berlin
10 Presburg
11 Berne
12 Lisbon
13 Madrid
14 Rome
15 Naples
16 Constantinople

Of the following sea-ports in Europe.

17 Dunkirk
18 Genoa
19 Malaga
20 Nice
21 Revel
22 Ismael
23 Port Mahon
24 Rochelle
25 Tornea

Of the following places situated in Asia.

26 Astracan
27 Tobolsk
28 Irkutsk
29 Pekin
30 Lassa
31 Cashgar
32 Samarcand
33 Aleppo
34 Ava, in Burmah
35 Calcutta
36 Delhi
37 Ispahan
38 Mecca, in Arabia

EXAMPLES FOR MAPS OF ENGLAND AND GERMANY.

39 Newcastle
40 Hull
41 Yarmouth
42 Dover
43 Portsmouth
44 Plymouth
45 Bristol
46 Liverpool
47 Ulm
48 Frankfort on the Main
49 Leipsic

Hanover 52 Munich 54 Olmutz
Dresden 53 Magdeburgh 55 Stralsund

Vhen the longitude is taken from Ferro Island, it may be reduced to meridian of London by the following

ULE.—If the longitude be *east*, 17° 45′ must be subtracted; if it *vest*, the same number must be added; and the sum or difference be the longitude from the meridian of London.

f the place lie between the meridians of Ferro and London, subtract longitude *east* from Ferro, from 17° 45′; and the remainder will he longitude *west* from London.

.B. The above rule reversed will reduce the longitude from Lon- to that from Ferro Island.

x. 1. The Cape of Good Hope has 36° 9′ E. L. from the meridian erro,—required the longitude from London? *Answ.* 18° 24′ E. L. n London.

. Gibraltar has 12° 23′ E. L. from Ferro,—what is its longitude n London? Ans. 5° 22′ W. L. from London.

. Cape Horn has 49° 40′ W. L. from Ferro,—required its longi- from London?

. Cape Comorin has 78° 5′ E. L. from London,—required the gitude from Ferro?

PROBLEM II.

ving the Latitude and Longitude given, to find the place.

Y THE GLOBE.—Bring the given longitude to the brass ridian; then, under the given latitude marked on the ss meridian, is the place sought.

Y MAPS.—The latitude and longitude being found at sides and ends of the Map, imaginary lines may, with aid of a pair of compasses and ruler, be extended from se points, which will meet at the place required.

EXAMPLES.

. What place is situated in 48° 23′ N. L. and 4° 39′ L. from London? Answ. Brest in France.

Required the names of the places situated in Afri whose latitudes and longitudes are as follow.

2.	30° 3′ N.	31° 21′ E.
3.	36 47 N.	10 16 E.
4.	12 45 N.	37 30 E.
5.	14 0 N.	33 0 E.
6.	34 29 S.	18 23 E.

Of these in America.

7.	46° 47′ N.	71° 10′ W.
8.	39 57 N.	75 13 W.
9.	39 0 N.	77 10 W.
10.	19 26 N.	100 6 W.
11.	29 58 N.	89 59 W.
12.	0 13 S.	77 55 W.
13.	12 1 S.	76 49 W.
14.	34 35 S.	58 31 W.
15.	22 54 S.	44 44 W.
16.	6 0 N.	55 30 W.
17.	4 56 N.	52 15 W.

Of these islands in the Atlantic.

18.	32° 37′ N.	16° 56′ W.
19.	37 47 N.	25 42 W.
20.	27 47 N.	17 46 W.
21.	15 10 N.	23 5 W.
22.	1 30 S.	7 20 W.
23.	7 57 S.	13 59 W.
24.	15 55 S.	5 49 W.

EXAMPLES FOR A MAP OF FRANCE.

Places seated on the River Seine.

25.	48° 18′ N.	4° 4′ E.
26.	48 34 N.	2 40 E.
27.	48 50 N.	2 20 E.
28.	49 26 N.	1 10 E.

Places on the Loire.

29.	46° 59′ N.	3° 9′ E.
30.	47 54 N.	1 54 E.
31.	47 24 N.	0 40 E.
32.	47 13 N.	1 33 W.

Places on the Rhone

33.	45° 46′ N.	4° 49′ E.
34.	45 0 N.	4 50 E.
35.	43 57 N.	4 48 E.

PROBLEM III.

To find the Difference of Latitude between two places.

If the latitudes are of the same name, subtract the less from the greater; if of contrary names, add them together.

In doing this and the next problem, either *globes, maps, or tables of latitude and longitude,* may be used.

When the two places are in opposite hemispheres, their latitudes being reckoned *different* ways, their sum must be taken; but when they are in the same hemisphere, their latitudes being reckoned the *same* way, their difference only must be taken.

EXAMPLES.

1. What is the difference of latitude between North Cape and C. Matapan in Europe? Ans. 34° 40′.
2. Between Tunis and C. of Good Hope? Ans. 71° 16′.
3. The middle of Nova Zembla and C. Comorin?
4. The mouth of Copper-Mine R. and Acapulco.
5. Between Cape Vela and Cape Horn, in S. America?
6. The south Cape of N. Holland and Torres Straits?
7. Between Cape Wrath and the Lizard Point?
8. Dunkirk and Perpignan? 9. Madrid and Mexico?
10. Between London and Botany Bay?
11. St. Jago, one of the Cape Verd Is., and St. Helena?
12. The Cape of Good Hope and Cape Comorin?
13. Calcutta and Batavia? 14. Manilla and Canton?

What is the difference of latitude between the following sea-ports in Europe?

15. Archangel and Bergen?
16. Christiania and Gottenburg?
17. Stockholm and Tornea?
18. Petersburgh and Dantzig?
19. Copenhagen and Hamburg?
20. Amsterdam and Dunkirk?
21. Brest and Bourdeaux?
22. Corunna and Oporto?
23. Lisbon and Cadiz?
24. London and Genoa?
25. Newcastle and Leghorn in Italy?

Required the difference of latitude between,

26. St. Salvador and Surinam.
27. Porto Bello & Magellan's St.
28. Trinidad Is. and Trincomalé.
29. Vera Cruz and Cape Horn.
30. St. Helena and Manilla in the Philipines.

PROBLEM IV.

To find the Difference of Longitude and of Time between two places.

If the longitude of both places be of the same name, subtract the less from the greater; if of different names, add them together for the answer in degrees.

The distance of two places can never be greater than half the circumference of the globe, or 180°; when, therefore, in adding, the sum exceeds that, subtract it from 360°, for the true difference.

Divide the number of degrees by 15 for the answer in hours; if there be a remainder, multiply it by 4 for minutes.

To reduce Hours into Degrees.—Multiply them by 15.

The principle of these rules is this: the sun, in his apparent motion round the earth, does his daily journey of 360° in 24 hours, which is at the rate of 15° in an hour, or 1° in 4 minutes.

EXAMPLES.

1. What is the diff. of long. and time between Lisbon and Philadelphia? Ans. 66° 9′=4 hrs. 24 min.

2. What is the difference of longitude and time between Newcastle and Moscow? Ans. 39° 9′=2 hrs. 36 min.

3. Between Constantinople and Pekin?

4. Otaheite and Tongataboo, in the Pacific Ocean?

5. London and Quebec? 6. Acapulco and Macao?

7. Port Sir Francis Drake, in America, and Nankin?

8. Pico, one of the Azores, and Botany Bay?

9. Vera Cruz and Siam? 10. Bergen and Bombay?

11. Bermudas Islands and Island of Rhodes ?
12. Mount Hecla and Mount Vesuvius ?
13. Constantinople and Batavia ?
14. Juan Fernandez and New Caledonia ?
15. Easter Island and Tongataboo ?
16. Marquesas and Navigator's Islands ?
17. Christmas Island and the Pelew Islands ?
18. Owhyhee and the Ladrone Islands ?
19. Oonalashka, on the north-west coast of America, and Jesso, on the north-east coast of Asia ?

EXAMPLES FOR A MAP OF EUROPE AND ASIA.

What is the difference of longitude between the following places ?

20. Gibraltar and Barcelona ?
21. Malaga and Naples ?
22. Toulon and Venice ?
23. Rome and Athens ?
24. Corinth and Akerman ?
25. Marseilles and Ancona ?
26. Bilboa and Leghorn ?
27. Genoa and Azof ?
28. Bombay and Calcutta ?
29. Smyrna and Canton ?
30. Calicut and Aracan ?
31. Ormuz and Okhotsk ?
32. Mocha and Pondicherry ?
33. Rhodes and Nankin ?
34. Iscanderoon and Madras ?
35. Surat and Batavia ?

PROBLEM V.

To find all those Places that have the same Latitude with a given Place.

By the Globe.—1. Bring the given place to the brass meridian, and observe the latitude.

2. Turn the globe round, and all places that pass under the latitude will be those required.

By Maps.—1. If a parallel of latitude be drawn through the given place, observe all those places which lie on it.

2. If not, an imaginary line may be drawn evenly with the nearest parallel.

The variety of the seasons, and the difference of the lengths of the days and nights, depending upon the difference of latitude, all places that have the same latitude have their seasons exactly alike, except what difference may arise from the local situation of the place: they have also the days and nights of the same length at the same time; but the hours of the day are different.

EXAMPLES.

1. What places have the latitude of Stockholm *Answ.*—Petersburgh; Vologda; Narym and (in Asia; Lake Athabasca; Churchill Fort, on I Bay; Cape Chidley, in Labrador; Cape Fare Greenland; and Mainland, one of the Shetland I

2. What places have nearly the same lat. as Edi *Answ.*—Elsinore, Memel, Polotsk, and Mo Europe; Casan and Tomsk, in Asia; Bhering's and Alashka and Severn-House, in America.

What places have nearly the same latitude as,

3. London?
4. Philadelphia?
5. Jerusalem?
6. Jamaica?
7. Quito?
8. St. Helena?
9. Cape of Good Hop
10. Cook's St. in New
11. Tranquebar?
12. Batavia?

PROBLEM VI.

To find all those Places that have the same Longi a given place.

By the Globe.—Bring the given place to meridian, and mark all the places then under dian, for the answer required.

By Maps.—Find the longitude of the given pl observe all those places that are upon the same or that are situated at the same distance from th meridian as the given place.

All places that have the same longitude have noon an at the same time, the other hours of the day also correspond

EXAMPLES.

1. What places have nearly the same long London? *Answ.* Poictiers, in France; Valencia cant, in Spain; Oran; and Cape Coast, in Africa

2. What places have nearly the same long

Genoa? *Answ.* Christiansand, Bremen, Berne, Corsica, Sardinia, and Tunis.

What are the places whose longitude is nearly the same as that of the following?

3. Cape of Good Hope?
4. Petersburgh?
5. Ispahan?
6. Pekin?
7. Jamaica?
8. Quebec?
9. Dublin?
10. Sandwich Islands?
11. Pelew Islands?
12. Stockholm?
13. Bombay?
14. Isle of Tinian?

QUESTIONS FOR EXERCISE IN SECTION I.

What are the latitudes and longitudes of,

1. Bergen?
2. Moscow?
3. Elsinore?
4. Barbadoes?
5. Turin?
6. Upsal?
7. Alexandria?
8. Prague?
9. Candia?
10. Jeddo?
11. Lubec?
12. Mocha?

What places correspond to the following latitudes and longitudes?

13.	33° 20′ N. L.	44° 24′ E. L.
14.	6 15 S. L.	106 25 E. L.
15.	36 31 N. L.	6 12 W. L.
16.	51 6 N. L.	13 31 E. L.
17.	49 59 N. L.	19 50 E. L.
18.	30 12 N. L.	91 20 E. L.

19. Lord Nelson obtained a victory over the French fleet near lat. 31° 11′ N., long. 30° 22′ E.: point out the place on the globe.

20. What places are in the same longitude as Moscow?

21. What places have the same longitude as Delhi?

22. What places have the same longitude as Astrachan?

23. What places have the same longitude as Malacca?

24. Where else is it midnight when it is midnight at Lima?

25. In the summer of 1827 Captain Parry arrived at 82° 45′ N. lat., 20° E. long.; point out the place.

QUESTIONS FOR EXAMINATION IN SECTION I.

Into how many degrees is a circle divided? What is the axis of the earth? What are the poles? What is the equator? What are meridians? What is the brazen meridian? How is it divided and numbered? How are meridian lines drawn on maps?

What is latitude? How many kinds of latitudes are there? What is the greatest latitude any place can have? Are there any places that have no latitude?

What is longitude? Which is the first meridian? How is longitude marked upon the globe and upon maps? What are parallels of latitude? How are parallels of latitude drawn on maps?

How are the latitude and longitude of any place found upon the globe? How are they found upon maps? How may east longitude be distinguished from west? When the longitude is taken from Ferro Island, how is it reduced to the meridian of London?

The latitude and longitude of a place being given, how is the place found? How is the difference of latitude between places found? How is the difference of longitude found? What is the greatest difference of longitude that can be between two places? If, in finding the difference of longitude between two places of different names, the sum is more than 180°, how is the true difference found?

How are degrees reduced into hours, and the contrary? How are all those places found which have the same latitude as any given place? How are all those places found which have the same longitude with a given place? Have places of the same longitude the same hours of the day at the same time?

SECTION II.

DEFINITIONS.

1. The *horizon* is either *rational* or *sensible.*

2. The *rational horizon* is a great circle, dividing the upper from the lower hemisphere.

3. The *sensible horizon* is that circle which is the boundary of our sight, or which separates the visible from the invisible portion of the earth's surface.

The sensible horizon increases in proportion to the elevation of the spectator; thus a person at the top of a mountain has a more extensive prospect than another person at the bottom.

The horizon of a place varies according to its latitude and longitude.

The horizon, on the globe, is a circular flat piece of wood, which sustains the globe, and which represents the rational horizon. It contains several circles: the innermost is marked with the points of the mariner's compass; the next exhibits the twelve signs of the zodiac: beyond which is a calendar, showing the months and days of the months, corresponding with the signs and their respective degrees; these ow the sun's place in the ecliptic, called the ***sun's longitude,*** for any ven day.

4. The *zenith* is that point in the heavens directly over ur heads, and is at an equal distance from all points of e horizon.

5. The *nadir* is that point in the heavens opposite the enith, and is directly under our feet.

The zenith and nadir are the poles of the horizon, being each 90° istant from it.

The *quadrant of altitude* is a thin slip of brass or other material, ivided into 90°, and is used to measure the distance of places, altides of the sun or stars, &c.

6. *Antœci* are those who live under the same meridian ut on different sides of the equator, and at equal disances from it; or they are those that have the same ngitude but opposite latitudes.

The appearances to the antœci are these:

They have the same hours, but contrary seasons at the same time: us when it is noon to the one it is noon to the other, and when it is mmer with the one it is winter with the other.

The days of the one are equal to the nights of the other; and the ights of the one to the days of the other.

The stars that never set to the one never rise to the other; and ntrariwise.

Those who live at the equator have no antœci.

7. *Periœci* are those who live under opposite meridians ut on the same side of the equator, and at equal distances om it; or they are those who have the same latitude but pposite longitudes.

The appearances to the periœci are these:

The hours of the day, though nominally the same, are really conary; for when it is noon with the one it is midnight with the other; d when it is two in the morning with the one, it is two in the afteron with the other, &c.

They have the same seasons of the year at the same time.

The length of the day or night at any place is always the same as it to the periœci of that place.

The sun and stars rise to both places on the same point of the horizon, and are the same number of hours above or below it.

The same stars that never rise or set to the one place never rise or set to the other.

Those who live at the poles have no periœci.

8. The *Antipodes* are those who live diametrically opposite to each other; or they are those who have both opposite latitudes and opposite longitudes.

A line, supposed to be drawn from any place through the centre of the earth, and continued to the opposite side, will point out the antipodes of that place. The north and south poles are antipodes to each other.

The appearances to the antipodes are these:

The hours of the day are contrary, it being noon to one when it is midnight to the other.

They have contrary seasons at the same time.

The days of the one are equal to the nights of the other; hence the shortest day to the one is the longest day to the other.

The sun and stars rise to the one when they set to the other, all the year round,—for they have the same horizon; but the zenith to the one is the nadir to the other.

Those stars that are always above the horizon of the one place are always under the horizon of the other.

PROBLEM VII.

To find the Antœci of any given place.

By the Globe.—Bring the given place to the meridian; and having found its latitude, count as many degrees from the equator towards the contrary pole,—and the point thus arrived at will be the antœci required.

By Maps.—Having found the latitude and longitude of the place, find another place of the same longitude whose latitude is equal to the former, but of a contrary name.

EXAMPLES.

Required the antœci of the following places:

1. Malta. *Answ.* Cape of Good Hope, nearly.
2. Potosi, in South America. *Answ.* Hispaniola.
3. Quebec. *Answ.* Patagonia, in South America.

4. Van Dieman's Land.
5. Madagascar (south point).
6. Cape Horn.
7. Juan Fernandez.
8. Kerguelen's Land.
9. Is. of Bermudas.
10. Falkland Isles.
11. Boston, U. S.
12. Azof.
13. Sandwich Is.

14. A ship in the Indian Ocean was in longitude 80° E., and in latitude 13° S.: required the antœci to that place.

Required the antœci to the following longitudes and latitudes:

15.	114° E.	22° S.	21.	156° W.	20° S.
16.	30 E.	60 S.	22.	150 W.	17 N.
17.	41 E.	21¾ S.	23.	173 W.	20 N.
18.	9 W.	39 S.	24.	151 E.	34 N.
19.	76 W.	18 S.	25.	165 E.	20 N.
20.	25 W.	15 S.	26.	88½ E.	22½ S.

PROBLEM VIII.

To find the Periœci of any given place.

By the Globe.—Bring the given place to the brass meridian, and set the index to 12.

Turn the globe till the index point to the other 12, that place below the meridian, whose latitude is equal to that of the given place, is the periœci required.

By Maps.—Subtract the longitude of the given place from 180°, and the remainder will be the longitude of the periœci, of a contrary name.

Find, by Prob. I., a place whose longitude is equal to this, and whose latitude is the same with that given.

EXAMPLES.

1. What place has its inhabitants the periœci of Newcastle-upon-Tyne? *Answ.* The Aleutian, or Fox Islands.

2. What place has its inhabitants the periœci of Quito? *Answ.* Podang, in the island of Sumatra.

3. Who are the periœci of California, in N. America?

Required the periœci of the following places.

4. St. John's, Newfoundland.
5. Philadelphia.
6. Gulf of Siam.
7. Cook's Strait.
8. Mindanao.
9. St. Petersburgh.
10. Sandwich Islands.
11. Society Islands.
12. Martinique.

Required the periœci to the following latitudes longitudes.

13.	179½°	E.	45°	N.
14.	132	W.	46	N.
15.	158½	W.	45	N.
16.	143	W.	35½	N.
17.	116°	W.	40	
18.	102½	W.	28	
19.	84	E.	19	
20.	127½	E.	47	

PROBLEM IX.

To find the Antipodes of any place.

Find the antœci of the given place, and the peri this will be the antipodes of the first place ; or, bri given place to any part of the horizon, and the pl the opposite point of the horizon will be the antipo

EXAMPLES.

1. What place is that the inhabitants of which a antipodes to Pekin? *Answ.* Near the mouth of th Sauces, or Colerado, in Patagonia.

2. Where are the antipodes of London? *Answ.* S. of New Zealand, in long. 180°, and 51° 31′ S.

What are the antipodes of the following places?

3. Cape Horn.
4. Otaheite.
5. New Caledonia.
6. Buenos Ayres.
7. Falkland Islands.
8. Madrid.
9. Juan Fernandez.
10. Friendly Isles.
11. Philippine Isles.
12. Sierra Leone.
13. Pelew Islands, in Eastern Archipel

14. A ship, in the Pacific Ocean, found its lat. 5 and long. 180°,—required the antipodes.

. Suppose a line drawn from the island of Jamaica ugh the centre of the earth, in what part would this meet the surface of the earth on the opposite side?

. Required the antipodes to the Bermudas.

equired the antipodes of the following longitudes and ıdes.

73° W.	6° N.	23.	106° W.	15½° S.
157 W.	37½ S.	24.	103 E.	12 N.
98 E.	23 S.	25.	144½ W.	32 S.
174 E.	16 N.	26.	165 E.	28 S.
166 W.	38 S.	27.	175 E.	36 S.
162 W.	60 S.	28.	177 E.	56 S.

PROBLEM X.

To elevate the Globe for the Latitude of any place.

levate the pole, which is of the same name with the ude, as many degrees as are equal to it, and bring the n place to the brass meridian.

hen the globe is rectified for the latitude of any place, that place the zenith, and the wooden horizon represents the rational horizon e place.

EXAMPLES.

. Elevate the globe for Lisbon.

'*ns.* The latitude of Lisbon is 39° N.; hence the h pole must be raised 39° above the horizon, and Lis- brought to the brass meridian.

. Elevate the globe for the Cape of Good Hope.

'*ns.* The Cape of Good Hope has 35° S. L.; hence south pole must be raised 35° above the horizon, and Cape of Good Hope brought to the meridian.

PROBLEM XI.

To find the Distance between two Places.

Case I.—When the distance is less than 90°.

. Lay the quadrant of altitude over both the places, that the division marked 0 may be on one of the places; then the degree cut by the other place will sh the distance in degrees.

2. Multiply these degrees by 69½, and the product be the distance in English miles.

It will in general be sufficiently accurate to multiply by 70.

Case II.—When the distance is greater than 90°.

1. Find the antipodes of one of the places, and Case I. measure the distance between it and the other

2. Subtract this distance from 180, and the remain will be the whole distance required.

EXAMPLES.

Required the distance between London and

1. Copenhagen. *Ans.* 9°, = 625 miles.
2. Stockholm. *Ans.* 13°, = 903 miles.
3. Petersburg.
4. Amsterdam.
5. Paris.
6. Berlin.
7. Vienna.
8. Berne.
9. Lisbon.
10. Rome.
11. Constantinople.
12. Grand Cairo.
13. Jerusalem.
14. Madras.
15. Botany Bay.
16. Otaheite.
17. Manilla.
18. Navarino.

19. What is the length of Europe, from Lisbon, i west, to the Uralian mountains, in the east?

20. How far is Constantinople from Pekin?

21. What is the breadth of N. America from the montory of Alashka to Cape Charles?

22. What is the breadth of S. America from Blanco, in Peru, to Cape St. Roque, in Brazil?

23. What is the breadth of Africa from Cape in the west, to Cape Guardafui, in the east?

24. What is the distance between Cape Verd, in A and Cape St. Roque, in America?

25. What is the distance between Panama, in Am and Manilla, one of the Philippine islands?

?6. Between Bombay and Nootka Sound?

?7. What is the distance between Newcastle and Malta,
way of Gibraltar?

?8. The following is the track pursued by Captain
ok, in his first voyage,—required its length.
om Portsmouth to Cape Verd Isles.
Cape Verd Isles to Cape Horn.
Cape Horn to Otaheite.
Otaheite to New Zealand, Cape South.
Cape South to Port Hicks, in New Holland.
Port Hicks, in New Holland, to Endeavour Straits.
Endeavour Straits to Batavia, in Java.
Batavia, in Java, to the Cape of Good Hope.
Cape of Good Hope to Ascension Island.
Ascension Island to the Azores.
Azores to England.

?9. How many miles will be gone over in the follow-
route:—from Newcastle to Carlisle, Lancaster, Li-
pool, Shrewsbury, Birmingham, Gloucester, Bristol,
ford, and London?

QUESTIONS FOR EXAMINATION IN SECTION II.

Vhat are the antœci, and what is observed of their hours of the day
seasons of the year? What are the periœci, and what is observed
ıeir hours of the day and seasons of the year? What are the anti-
es, and what is observed of their hours of the day and seasons of
year?

low is the horizon distinguished? What is the sensible horizon?
at is the rational horizon? What is the wooden horizon? Doe
present the rational or sensible horizon? What circles are marked
n the wooden horizon, and what is their use?

Vhat is the zenith of any place, and what is the nadir? What is
quadrant of altitude, into how many degrees is it divided, and what
s principal use?

low are the antœci, the periœci, and the antipodes of any place
ıd upon the globe, and how upon maps? Where must those people
that have no antœci? What point upon the globe has no periœci?
ere are the antipodes to the north pole?

low is the globe elevated for the latitude of any place?

low is the distance of two places found, when that distance is less than 90°? How is the distance of two places found, when it is more than 90°? Why must degrees be multiplied by 69½ to bring them to English miles?

QUESTIONS FOR EXERCISE IN SECTION II.

Required the antœci answering to the following:

	Longitude.		*Latitude.*	
1.	33°	16′ E.	34°	30′ S.
2.	72	18 W.	19	46 S.
3.	170	0 W.	14	0 N.
4.	13	43 E.	38	10 S.

Required the periœci answering to the following:

5.	20°	0′ W.	56°	0′ N.
6.	83	2 W.	17	0 N.
7.	100	8 W.	11	42 N.

Give the antipodes corresponding to the following:

8.	171°	30′ E.	52°	0′ S.
9.	160	0 E.	63	20 S.
10.	176	6 W.	39	51 S.

11. Required the shortest distance between Africa and America.

12. Required the number of miles that an East India ship sails in her voyage from London to Madras.

13. How many miles must a ship sail in going from St. John's, in Newfoundland, to Nootka Sound,—and what is the difference between this distance and the direct distance between the two places?

14. How many miles does a ship sail in her voyage from London to Botany Bay, supposing her to go in as straight a course as possible?

15. What is the distance between the north and south Poles?

Measure the distances between the following places on a map.

16. Ushant Island and Strasburg.
17. Calais and Montpelier.
18. Bourdeaux and Narbonne.
19. Caen and Geneva.
20. Havre de Grace and Nice.
21. St. Maloe and Marseilles.
22. Toulouse and Paris.

SECTION III.

DEFINITION.

The *horary*, or *hour* circles, are small circles on the globe, placed at the north and south poles, having the hours of the day marked upon them, with an index to each.

THE TIME OF DIFFERENT PLACES COMPARED.

The earth, turning on its axis from *west* to *east*, causes different part of its surface to be successively presented the sun. When the meridian of a place is directly oppote the sun, it is noon to all places on that meridian.

The meridians that lie to the east will come opposite to e sun before those that lie to the west; and hence the eople there will have noon so much sooner,—the other ours of the day will be proportionably advanced.

The earth taking 24 hours to turn round on its axis, e rate at which it turns per hour may be found by diiding 360 (the number of degrees in the circumference of e globe) by 24: the quotient, 15, is the number of derees the earth turns in an hour. Thus, a place that lies 5° to the east will have noon one hour sooner; if it lie 0° or 45°, it will have noon two or three hours sooner; d so on in the same proportion.

Places that lie 15°, 30°, or 45° to the W. will have noon ne, two, or three hours later; and so on in proportion.

PROBLEM XII.

he Hour being given at any Place, to find what Hour it is in any other Part of the World.

1. Bring the place, at which the time is given, to the eridian, and set the index to the given hour.

2. Turn the globe till the other place come to the meidian, and the index will show the time required.

By Calculation.—Find the difference of longitude etween the two places, and reduce it to time.

Add this difference of time to the given hour, if the lace at which the time is required lie to the east; but ubtract it, if it lie to the west.

1. If, in adding, the sum is greater than 12, take 12 away, and hange the name from morning to afternoon hours, or *vice versa*.

2. If, in subtracting, the difference of time be greater than the given our, add 12 to the given hour, and change the name.

3. By this *problem* the longitude of places is determined; for if by

astronomical observation, or any other means, it can be known what hour it is at London, and at the place whose longitude is to be determined, this difference of time, reduced to degrees, will give the longitude of that place; and which will be east or west according as the time is sooner or later.

EXAMPLES.

1. What hour is it at Boston, in America, when it is 3 *p.m.* at London? *Answ.* 18 min. past 10 *a.m.*

This example performed without the globe.

The longitude of Boston is 70° 30′, which, in this example, is the difference of longitude = 4 hrs. 42 m. diff. of time.

Boston lying to the west, this must be subtracted; but the difference here being greater than the hour given, add 12 to the given hour, as directed in note 2, and change the name from *p.m.* to *a.m.*

Thus, 3 hrs. 0 min. *p.m.* given hour.
12 0 added.

15 0
4 42 difference of time, subtracted.

Answ. 10 hrs. 18 min. *a.m.*

2. What is the hour at Pekin, when it is 9 *a.m.* at Lisbon? *Answ.* 22 min. past 5 *p.m.*

The difference of longitude is 125° 33′ = 8 hrs. 22 min.; and as Pekin is east of Lisbon, this must be added.

9 hrs. 0 min. *a.m.* given hour.
8 22 difference of time.

17 22
12 0 subtracted.

Answ. 5 hrs. 22 min. *p.m.*

Having the hour given at one place, required the hour at the other place given in the following examples:

Place where time is given.	*Given time.*	*Place where time is required.*
3. Newcastle,	11 *a.m.*	Port Royal.
4. ———	7 a.m.	Madras.

	Place where time is given.	*Given time.*	*Place where time is required.*
5.	Newcastle,	6 *p m.*	Pelew Islands.
6.	————	5 *a.m.*	Nootka Sound.
7.	London,	Noon	Society Isles.
8.	Cairo,	9 *a.m.*	Botany Bay.
9.	Lisbon,	11 *p.m.*	Canton.
10.	Port Royal,	11 *a.m.*	Owhyhee.
11.	Oporto,	6 *a.m.*	Damascus
12.	Warsaw,	10 *p.m.*	Astracan.
13.	Naples,	9 *a.m.*	Lassa (Tibet).
14.	Geneva,	4 *a.m.*	Quito.
15.	Lyons,	Midn.	Mexico
16.	Edinburgh,	3 *p.m.*	Delhi.
17.	Presburg,	6 *p.m.*	Surat.
18.	Cherson,	1 *a.m.*	Charlestown.
19.	Venice,	2 *a.m.*	New York.
20.	Constantinople,	8 *p.m.*	Lima.
21.	Calcutta,	7 *a.m.*	Cayenne.
22.	London,	Noon	Nankin.
23.	———	4 *p.m.*	Rome.
24.	———	4 *p.m.*	Madras.
25.	———	4 *p.m.*	Barbadoes.

PROBLEM XIII.

Having the Hour given at any place, to find where it is Noon.

By the Globe.—Bring the given place to the meridian, and set the index to the given hour.

Turn the globe till the index point to 12 at noon, and the places then under the meridian are those required.

By Calculation.—Reduce the number of hours between the given time and noon into degrees, and it will be the difference of longitude between the places.

When the given hour is in the morning, the place where it is noon will lie so many degrees to the eastward: hence the difference of longitude must be added to the longitude of the given place, if it be E.; but substracted from it, if it be W.

When the hour is in the evening, the places where it is noon will lie to the westward of the given place: hence the difference of longitude must be added, if the longitude of the given place be W.; but subtracted if it be E.;—and the sum, or difference, will be the longitude of the places required.

1. If, in subtracting, the difference of longitude be greater than the longitude of the given place, subtract the latter from the former—and the remainder of a *contrary name* will be the longitude required.

2. If, in adding, the sum exceeds 180°, subtract it from 360°, and the remainder will be the required longitude, but of a *contrary name.*

3. By this problem, it may also be found where it is any other given hour; only, instead of turning the globe till the index point to 12, turn it till it point to the given hour.

EXAMPLES.

1. Where is it noon, when it is 5 *p.m.* at Paris?

Calculation.—5 hours = 75° the difference of longitude. As the given hour is evening, the places where it is noon will lie to the west. The longitude of Paris is 2° 20′ E.: from this, according to the rule, 75° ought to be subtracted; but as that cannot be done, subtract 2° 20′ from 75°, (as directed in note 1,) and the remainder, 72° 40′, will be the longitude of the places required, and will be W., being of a contrary name. It will therefore be noon at Labrador, New England, Pennsylvania, St. Domingo, Terra Firma, Peru, &c.

2. Where is it noon, when it is 9 *a.m.* at Newcastle?

Answ. Nisney Novogorod, in Russia; Armenia and Georgia; Bagdad; the middle parts of Arabia; Mocha; the Strait of Babelmandeb; the north-east part of Africa; and the western coast of Madagascar.

3. When it is 7 *a.m.* at Kingston, in Jamaica, where is it noon? *Answ.* At London, and all other places which are situated under the meridian of London.

4. At 40 m. past 2 *p.m.* at Ispahan, where is it noon?

5. Where is it noon, when it is 1 *a.m.* at New Zealand?

6. Where is it noon, when it is midnight at London?

7. When it is 7 *a.m.* at Jerusalem, where is it noon?

8. When it is midnight at Mexico, where is it 9 *a.m.*?

9. Where is it noon, when it is 4 *a.m.* at Botany Bay?

10. Where is it midnight, when it is ½ past 10 *a.m.* at Bencoolen, in Sumatra?

11. When it is $4\frac{3}{4}$ *p.m.* at Paris, where is it noon?

12. At $\frac{3}{4}$ past 7 *a.m.* at Shiraz, where is it noon?

13. Being noon at London, where is it $\frac{1}{2}$ past 8 *a.m.*?

14. When it is 2 o'clock in the afternoon at London, at what place is it $\frac{1}{2}$ past 5 in the afternoon?

15. Being noon at Bombay, where is it $\frac{1}{2}$ past 6 *a.m.*?

16. When it is midnight at Brusa, where is it 3 *p.m.*?

17. When it is $\frac{1}{2}$ past 6 in the morning at Quebec, where is it 11 in the forenoon?

QUESTIONS FOR EXAMINATION IN SECTION III.

What are the horary circles? How does the earth turn on its axis? What is it that produces noon at any place? Do the meridians that lie to he east, or those that lie to the west, come sooner opposite to the sun?

How long is the earth in turning on its axis? At what rate does it urn per hour? How is that found? How many degrees of longitude make an hour's difference of time? To places that lie in 30° E. L. are he hours of the day more or less advanced than they are at London?

Having the hour given at any place, how is it found what hour it is at ny other place? Having the hour given at any place, how is it found here it is noon?

QUESTIONS FOR EXERCISE IN SECTION III.

.	*When it is*	*At*	*What time is it at*
1.	10. *a.m.*	London,	Calcutta and Canton?
2.	8. *a.m.*	Dublin,	Pelew Is., Barbadoes, & Lima?
3.	Midnight	Rome,	Owhyhee and Easter Is.?
4.	9. *a.m.*	London,	Botany Bay?
5.	1. *p.m.*	Dublin,	Boston, U. S.?

6. How much are the clocks at Barbadoes behind ours?
7. Where is it noon, when it is 3 *a.m.* at Newcastle?
8. Where is it noon, when it is 7 *p.m.* at Pekin?
9 When it is midnight at Mexico, where is it noon?
10. When is it 11 *p.m.* at Jamaica, where is it noon?
11. When it is 3 *a.m.* at Paris, where is it noon?

12. My watch was well regulated at London, and when I arrived at Madras, which was after a five months' voyage, it was 4 hours 50 min. ower than the clocks there. Had it gained or lost during the voyage, nd how much?

13. When it is 7 *p.m.* at Edinburgh, what is the hour at Washington?
14. When it is 5 *p.m.* at Philadelphia, where is it midnight?

15. Are the clocks at Calcutta faster or slower than the clocks at London, and how much?

SECTION IV.

DEFINITIONS.

1. The *ecliptic* is the circle described by the earth in its annual motion round the sun; or it is that circle in which the sun *appears* to move.

The ecliptic is proper only to the celestial globe; but, on account of its great use in performing many geographical problems, it is always drawn on the terrestrial: it crosses the equator obliquely, and extends 23° 28′ to the north of it on one side, and 23° 28′ to the south of it on the other side. The angle which it makes with the equator is called the *obliquity* of the *ecliptic.*

It is called the ecliptic, because eclipses happen when the moon is in or near this circle: it is divided into 12 equal parts, called signs, each containing 30 degrees; they are thus marked and named;

Northern.

Spring.	Aries, or the Ram . . .	♈	Summer.	Cancer, or the Crab . . .	♋
	Taurus, or the Bull . .	♉		Leo, or the Lion	♌
	Gemini, or the Twins .	♊		Virgo, or the Virgin . . .	♍

Southern.

Autumn.	Libra, or the Balance . .	♎	Winter.	Capricornus, or the Goat.	♑
	Scorpio, or the Scorpion	♏		Aquarius, or the Waterman	♒
	Sagittarius, or the Archer	♐		Pisces, or the Fishes . . .	♓

The winter and spring signs are termed *ascending,* and the summer and autumnal *descending.*

2. The *tropics* are parallel to the equator, and distant from it 23° 28′: that which lies on the north side is called the *tropic of cancer;* and that which lies on the south side is called the *tropic of capricorn.*

The obliquity of the ecliptic determines the distance of the tropics from the equator; as they are drawn parallel to the equator, through those two points of the ecliptic which are at the greatest distance from it. The northern tropic is called the tropic of cancer, because it passes through the sign cancer; the southern, the tropic of capricorn, because it passes through the sign capricorn.

3. The *polar circles* are two circles, which are parallel to the equator, and as far distant from the poles as the tropics are from the equator: that which lies towards the north pole is called the *arctic* circle, and that which is towards the south pole is called the *antarctic* circle.

The distance of the polar circles from the poles depends upon the obliquity of the ecliptic: their distance from the poles being 23° 28′, their distance from the equator is 66° 32′.

4. The *equinoctial points* are those points in which the equator and ecliptic cross each other; they are the first points of aries and libra.

5. The *solstitial points* are those two points of the ecliptic that are at the greatest distance from the equator, and at which the ecliptic touches the tropics: they are the first points of cancer and capricorn.

6. *Declination* of the sun is its distance north or south of the equator.

7. *Altitude* of the sun is its distance above the horizon.

8. The *analemma* is a calendar of the months, placed on some vacant part of the globe, extending from tropic to tropic; the months and days are so divided as to correspond to the sun's declination for every day in the year.

The days increase continually to all places in the northern hemisphere, whilst the sun is moving through the ascending signs, or from the first of capricorn to the first of cancer; *i. e.* from Dec. 21st to June 21st: but the contrary happens to all places in the southern hemisphere; the days there increasing whilst the sun moves from cancer to capricorn, or from June 21st to Dec. 21st.

As, at the equator, the days and nights are always equal, so, of all other places, those that are the nearer to the equator have the less inequality in their days and nights; and the greater the latitude of the place, the greater is the length of its longest day. The length of the longest day at any place is equal to the length of its longest night.

The sun's declination is *north* from March 21st to September 23rd, and *south* the remainder of the year. Its greatest declination, either north or south, is 23° 28′.

The sun's altitude, or height above the horizon, will be increasing to any place, whilst the days are increasing at that place; and its altitude on the same day will be different to places that have different latitudes: hence the sun's meridian altitude furnishes an easy method of determining the latitude of a place.

Of the length of the Days and Nights.

The sun shining upon the earth illuminates that half of it which is turned towards it; the enlightened part intercepts the sun's rays from the other half.

The horizon represents, on the globe, the boundary line between light and darkness.

In the problems respecting day and night, the sun is supposed to be in the zenith; his rays, therefore, which extend to the horizon, will spread exactly 90° in every direction.

As the earth turns round on its axis from W. to E., once in 24 hrs., every meridian will, in that time, successively enjoy the light of the sun, and be deprived of it.

Suppose a patch to be put upon a globe to represent any place, and the globe to be turned round from west to east; when the place comes to the western side of the horizon, the sun appears to the inhabitants of that place to be rising in the east; but it is more properly the inhabitants of that place rising in the west. Continue to turn the globe round, and the place will ascend higher towards the meridian, which causes the sun to appear to ascend in a contrary direction.

When the place has arrived at the meridian, it will then be noon there, and the sun will be at his greatest altitude for that day.

As you continue to turn the globe, the place will gradually recede from the meridian, and descend towards the eastern horizon,—which will cause the appearance of the sun descending towards the west. When the place has arrived at the eastern horizon, as it is then going below the terminator, or boundary of light and darkness, the sun will appear to be setting in the west.

The place having gone below the horizon, and being now at a greater distance than 90° from that point where the sun is vertical, is deprived of his light, and continues in darkness till, by the revolution of the earth, it arrive again at the western horizon,—when the sun will appear to rise as before.

It is evident that the sun will be rising at the same instant of time to all places that are on the western side of the horizon, and that it will be setting at the same time to all places that are on the eastern side.

Twice a year the days and nights are of the same length to all places upon the earth: these two days are when the sun is in the first of aries and libra, or March 21st, and September 23rd. These are called the *equinoxes*,—March 21st the *vernal*, and September 23rd the *autumnal equinox*.

On these days the sun's place is on the equator. Let the equator be placed in the zenith, and the poles be made to coincide with the horizon. Fix upon any number of places situated upon the same meridian of longitude, say the first, distinguish them by patches, bring them to the brass meridian, and set the index to 12 o'clock. Turn the globe till they come to the western horizon, and the index will then be six o'clock *a.m.*, which will be the hour of the sun's rising; continue to turn the globe from west to east till the places have arrived at the eastern horizon, and the index will now point to six o'clock *p.m.*, the time of the sun's setting. Hence, the length of the day to all these places is twelve hours. Now if the same thing happens with any other places on any other meridian, say the opposite, it is evident that the days and the nights must be twelve hours to every place, or that they are equal all over the globe.

At all places under the equator the days and nights are always equal.

In proof of this it may be observed, that in whatever situation the equator may be placed, provided it be not parallel with the horizon, it is always cut by the horizon into two equal parts. The equator dips beneath the horizon on the one side exactly where it is marked east, and on the other where it is marked west; which two points are half a circle from each other.

In all places between the equator and the north pole the day is longest when the sun is in the first degree of cancer, June 21st,—and shortest when in the first of capricorn, Dec. 21st; but in those places between the equator and the south pole the contrary happens,—the day is shortest when the sun is in the first of cancer, and longest when in the first of capricorn. June 21st is called the *summer solstice,* it being then summer to all places in the northern hemisphere; and Dec. 21st, the *winter solstice,* it being then winter to the same places.

On the 21st of June the sun is 23° 28′ to the north of the equator; his rays, which still extend 90° on all sides of him, will penetrate 23° 28′ further north than they did when he was on the equator, and be withdrawn to the same extent from the south. To put the globe in the position which the earth will occupy with respect to the sun on the 21st June, raise the north pole 23° 28′ above the horizon. Then fix upon some places having the same longitude, taking care that one shall be in the south and another in the north frigid zone. On turning the globe from west to east it will be seen that the place in the north frigid zone never goes below the horizon, and that the one in the south frigid never rises above it, while of the other places, that will appear first upon the horizon whose latitude north is greatest. If the elevation of the north pole be diminished, it will be found that the length of the days to the places north of the equator lessens, and if the south pole be elevated, those parts possessing a southern latitude will have the same length of day which those of a northern latitude formerly enjoyed.

PROBLEM XIV.

To find the Sun's place in the Ecliptic.

1. Seek the given day in the calendar on the horizon, and against it, in the adjoining circle, will be found the sign and degree in which the sun is for that day.

2. Find the same sign and degree in the ecliptic, and this is the sun's place for that day at noon.

EXAMPLES.

What is the sun's place on the following days?

1. March 10th *Answ.* ♓ 20° 7′.
2. June 4th *Answ.* ♊ 13° 57′.
3. January 1st
4. February 2nd
5. March 3rd
6. April 4th
7. May 5th
8. June 6th

July 7th
August 8th
September 9th
October 10th
November 11th
14. December 12th
15. March 22nd
16. June 22nd
17. September 23rd
18. December 22nd.

PROBLEM XV.

To find the Sun's Declination.

ring the sun's place for the given day to the brass idian, and the degree over it will be the declination ght; or bring the day of the month marked on the emma to the brass meridian, and the degree over it be the declination, as before.

e sun's declination is given in several of the almanacks, and also in e I. at the end of this work.

The declination of the sun being its distance N. or S. from the tor, this problem is the same as that for finding the latitude of a place.

The greatest north declination, 23° 28′, is when the sun enters er, June 21st,—that being the greatest distance of the ecliptic of the equator. The greatest south declination, 23° 28′, is when ers capricorn, December 21st,—that being the greatest distance of cliptic south of the equator.

EXAMPLES.

Vhat is the sun's declination for the following days?

1. March 10th	*Answ.* 3° 54′ S.
2. January 31st	*Answ.* 17° 14′ S.

3. April 23rd
4. August 12th
5. August 1st
6. March 5th
7. July 23rd
8. October 19th
9. On what days has the sun no declination?
0. When has the sun the greatest declination north?
1. When has the sun the greatest declination south?
2. What is the sun's declination for to-day?

PROBLEM XVI.

To rectify the Globe for the Sun's place on any day.

. Find the sun's declination for the given day.

2. Elevate the pole, which is of the same name as the declination, as many degrees as are equal to it.

When the globe is rectified for the sun's place, and the sun brought to the zenith, the horizon will be the *terminator*, or boundary circle of light and darkness; it will therefore be day with those places that are above the horizon, and night with all that are below it.

EXAMPLES.

1. Rectify the globe for the sun's place on June 4th.

Answ. On June 4th the sun's decl. is 22½° N.; the north pole must therefore be raised 22½° above the horizon.

2. Elevate the globe for the sun's place on October 6th.

Answ. The sun's decl. on Oct. 6th is 5° S.; hence the south pole must be elevated 5° above the horizon.

PROBLEM XVII.

To find the Rising and Setting of the Sun, and the Length of the Day and Night.

1. Elevate the globe for the sun's declination, bring the given place to the meridian, and set the index to 12.

2. Turn the globe till the given place come to the eastern edge of the horizon, and the index will show the time of the sun's rising.

3. Bring the place to the western edge of the horizon, and the index will show the time of its setting.

4. Double the time of the sun's setting for the length of the day, and of the sun's rising for the night.

If the hour circle have a double row of figures, make use of that which increases towards the *east;* the sun's rising and setting may then be found at once, by bringing the place only to the eastern edge of the horizon, for the index will point in one row to the hour of rising, and in the other (that which increases towards the *west*) to the hour of setting.

This problem may also be performed thus.

1. Elevate the globe for the latitude of the place, bring the sun's place to the meridian, and set the index to 12.

2. Bring the sun's place to the eastern horizon, and

e index will show the time of the sun's rising, and the western edge for the time of setting.

EXAMPLES.

1. Required the time of sun-rise and sun-set at Edin-rgh on June 1. *Answ.* Rises 3 h. 27 m., sets 8 h. 33 m.

2. At what time does the sun rise and set at London on ly 17th, and what is the length of the day and night? *Answ.* The sun rises at 4, and sets at 8, the length of day is 16 hours, and the night eight hours.

Required the rising and setting of the sun at

3. Pekin, April 10.
4. Newcastle, Oct. 13.
5. Gibraltar, Jan. 22.
6. Petersburg, June 21.
7. Hamburgh, Dec. 21.
8. North Cape, Dec. 21.
9. Botany Bay, May 25.
10. London, Aug. 29.

Cape Horn, on the following days:

11. January 20.
12. March 2.
13. March 22.
14. April 6.
15. June 21.
16. July 21.
17. August 29.
18. October 14.

Edinburgh, on the following days:

19. January 29.
20. March 2.
21. March 22.
22. April 6.
23. June 21.
24. July 12.
25. August 29.
26. October 14.

27. At Archangel, London, Vienna, Jerusalem, Quito, d Cape of Good Hope, on March 21st and Sept. 23rd.

What is the length of the longest and shortest day, and difference between them, at the following places?

28. Archangel.
29. London.
30. Owhyhee.
31. Quito.
32. Quebec.
33. Cape of Good Hope.
34. Vienna.
35. Lima.
36. Alexandria.
37. St. Helena.
38. Washington.
39. Pekin.
40. Madras.
41. Borneo.
42. Calcutta.
43. Okhotsk.

What is the length of the day, and of t
December 26th, at the following places?

44. Dresden. 46. Adrianople. 48
45. Turin. 47. Shiraz.

49. What is the hour of the sun's rising a
ples, and Philadelphia, on August 29th?

50. How much longer is the sun above th
June 21st, to Edinburgh than to London?

51. How much longer is June 21st at St.
than at Jerusalem?

52. At what time does the sun rise and
bergen, on April 5th?

PROBLEM XVIII.

To find the Sun's Meridian Altitude for

By the Globe.—1. Elevate the globe fo
of the given place; find the sun's place f
day, and bring it to the brass meridian.

2. Fix the quadrant of altitude on the zeni
it over the sun's place; then the degree upon
cut by the sun's place will be its meridian al

Note.—The sun's meridian altitude may be found w
drant, by counting upon the meridian the number of
cepted between the horizon and the sun's place.

By the Analemma.—Elevate the globe fo
and bring the analemma to the brass meridiar
ber of degrees intercepted between the day
marked on the analemma, and the nearest
horizon, either north or south, will be the n
tude required.

By Calculation.—1. Find, from the Table, the s
for the given day.

2. If the declination be of the same name as the lati
ference will be the zenith distance.

3. If the declination and latitude be of different na
will be the zenith distance.

4. The zenith distance, taken from 90°, will give the altitude.

To know whether the Sun's Meridian Altitude be North or South.

RULE.—1. When the declination and latitude are of different names, i. e. the one north and the other south, the altitude is always of the same name as the declination.

2. When the latitude and declination are of the same name, if the declination be the greater, the altitude is also of the same name, otherwise it is of a name contrary to that of the declination.

EXAMPLES.

Required the sun's meridian altitude, June 21st.

(1.) *At Archangel.*
Lat. 64° 34′ N.
Dec. 23 28′ N. subtract.
41 6 zenith dist.

90 0
41 6 subtract.

Ans. 48 54 m. alt. *south*, the latitude being greater than dec.

(2.) *At Bombay.*
Dec. 23° 28′ N.
Lat. 18 57 N. subtract.
4 31 zenith dist.

90 0
4 31 subtract.

Ans. 85 29 altitude N., the declination being greater.

3. What is the sun's meridian altitude at the Cape of Good Hope on May 15?

The lat. 34° 29′ S. *added* to the dec. 18° 46′ N. gives 53° 15′ zenith dist., and this taken from 90 = 36° 45′ altitude N., being of the same name with the declination.

4. What is the sun's meridian altitude at Corinth, on March 21st?

On March 21st the sun has no declination; hence the zenith distance is equal to the latitude, 37° 30′; which taken from 90° gives 52° 30′ south altitude.

5. Required the sun's meridian altitude at Newcastle:
Dec. 21. March 21. June 21.

6. What is the sun's meridian altitude at Cairo, on
Dec. 21? March 21, or Sept. 23? June 21?

7. What is the sun's meridian altitude at Port Royal,
Dec. 21? March 21, or Sept. 23? June 21?

8. Required the sun's meridian altitude for the following places, on December 21st and June 21st?

Bergen,
Quebec.
Athens.
Mocha (Arabia).
Batavia.
St. Helena Isle.
Botany Bay.
Cape Horn, in S. America.

9. What is the sun's meridian altitude at the following places, on the following days?

Gottingen,	April 17th, and August 1st?
Canary Isles,	May 15th, and December 25th?
Port Mahon,	February 28th, and July 7th?
Smyrna,	May 1st, and November 11th?

To all places situated north of the tropic of cancer the sun's meridian altitude is always south; to all places situated south of the tropic of capricorn its meridian altitude is always north; and to those places situated between the tropics its meridian altitude is sometimes north and sometimes south.

From the above examples it will be seen, that the difference between the sun's greatest and least meridian altitudes, at any place situated without the tropics, is equal to 46° 56′, or twice 23° 28′, the distance of each tropic from the equator.

PROBLEM XIX.

To find the Sun's Altitude for any Hour, aving the latitude and the day of the month given.

1. Elevate the globe for the latitude, bring the sun's place to the meridian, and set the index to 12 at noon.

2. Turn the globe till the index point to the given hour; and having screwed the quadrant of altitude on the zenith, bring it over the sun's place.

3. Then the degree on the quadrant cut by the sun's place will be the altitude required.

EXAMPLES.

1. Required the altitude of the sun at Jerusalem, on October 21st, at ten o'clock, *a.m.* *Answ.* 38°

2. At Petersburg, June 21st, at 6 *p.m.* *Answ.* 20°

Required the sun's altitude at the following places:

3. Jamaica, Dec. 1st, at 3 *p.m.*

4. London, May 1st, 10 *a.m.*

5. Spitzbergen, June 21st, midnight.

New Orleans, Dec. 21st, 4 *p.m.*
Cape of Good Hope, May 15th, 10 *a.m.*
Washington, Sept. 25th, 3 *p.m.*
Louisburg, March 27th, 11 *a.m.*
Edinburgh, Nov. 30th, 10 *a.m.*
Malta, June 9th, 8 *a.m.*
Glasgow, April 4th, 3 *p.m.*

re examples, see Problem XVII., on the celestial globe.

PROBLEM XX.

the Sun's Meridian Altitude, to find the Latitude of the place.

; the sun's place to the meridian, and move the p or down, till the distance between the sun's ıd the north or south point of the horizon (as the ıuires) be equal to the given altitude; then will ation of the pole be the latitude required.

lculation.—1. Subtract the altitude from 90° for the zenith which is N. if the zenith be north of the sun; or S., if it be ary.

the zenith distance and declination be both north or both d them together; but if one be north and the other south, he less from the greater, and the sum or difference will be de of the same name with the greater.

EXAMPLES.

he sun's meridian altitude on the 18th of May, ' 13′ S.; required the latitude.

case, the sun's altitude being S., the zenith will be N. of the ing always of the contrary name to the altitude.

90° 0′
42 13 S.

47 47 zenith distance N.
Add 19 24 sun's declination N.

Answ. 67 11 N. lat., the zenith distance and declination being of the same name.

2. What is the latitude of the place at which the sun's m. alt., August 5th, is 74° 24′ N.? *Answ.* 1° 36′ N.

Required the latitudes coinciding with the annexed meridian altitude of the sun, on the days given.

3. Sun's meridian altitude 38° S. January 13th.
4. ———————— 48 S. February 17th.
5. ———————— 18 S. March 11th.
6. ———————— 30 S. April 24th.
7. ———————— 64 S. May 17th.
8. ———————— 35 S. June 4th.
9. ———————— 25 N. July 29th.
10. ———————— 48 N. August 6th.
11. ———————— 50 N. November 19th.

12. Observing the sun's meridian altitude, on June 5th, to be 70½° S.; and at the same instant observing a time-piece regulated for Greenwich, found it to be 10 min. past 11 *a.m.*; required the place of observation.

13. On March 21st the sun's meridian altitude was found by observation to be 52° 30′ S., and the difference of time between the place of observation and London was 1 hr. 32 min. sooner,—required the place.

14. The sun's meridian altitude, May 15th, was observed to be 36° 45′ N., and it was 13 min. past 1 *p.m.* when it was noon at London,—required the place.

15. Required the latitude and longitude of that place where the sun's meridian altitude, on May 21st, was 78° S., and where it was 3 *p.m.* when it was noon at London.

16. A ship, sailing from Jamaica, took the sun's meridian altitude on January 21st, and found it to be 50° S.; and at the same instant observed a time-keeper, regulated for London, to point to 42 min. past 2 *p.m.*; how far was the ship distant from Jamaica?

17. At a certain place, where the clocks are 2 hrs. faster than at London, the sun's meridian altitude was observed to be 30° to the south of the observer, on the 21st of March; required the place.

18. At a place where the clocks are 3 hrs. 32 min. ater than at London, the sun's meridian altitude was bserved to be 80½° S. on June 9th; required the place.

19. Where the clocks are 5 hrs. slower than at Lonon, the sun's mer. alt. was observed to be 60° to the outh of the observer, on April 16th; required the place.

20. In what latitude is the sun's greatest meridian altiude 79° S.?

21. Where has the sun no zenith distance on Sept. 23d?

PROBLEM XXI.

To find when the Sun is due East or West, the latitude of the place and the day of the month being given.

1. Elevate the globe for the latitude of the place, bring the sun's place to the meridian, and set the index to 12.

2. Fix the quadrant of altitude in the zenith, and bring it, if the sun's declination be of the same name with the latitude, to the *eastern* point of the horizon; then turn the globe till the sun's place come to the edge of the quadrant, and the index will show the time when the sun is due east.

3. If the declination and latitude are of different names, bring the quadrant to the *western* point of the horizon, and turn the globe till the point in the ecliptic, opposite to the sun's place, come to the edge of the quadrant, and the index will show the time when the sun is due east.

4. Subtract the hour, when the sun is due east, from 12, for the time when it is due west.

When the declination and latitude are of the same name, the sun is due east after rising, but when of different names, the sun is due east before rising.

As it is not so convenient to observe when the sun is due east below the horizon, the opposite point of the ecliptic is brought due west, and the index then shows the time of the sun's being due east.

EXAMPLES.

1. When is the sun due east and west at Newcastle, Nov. 3d? *Answ.* E. ¼ past 5, and W. ¼ before 7.

2. At Leghorn, June 21st? *Ans.* E. 7¾, and W. 4¼.

3. At London, on the summer and winter solstices?

4. Liverpool, April 23d and Dec. 15th?

5. At the following places, on March 21st, and Sept. 23d; viz. Panama, on the Isthmus of Darien; Truxillo in Peru; and Paramariboo, in Surinam?

6. At Buenos Ayres, Feb. 2d?

7. At Carlscrona, April 4th?

8. At Bursa, on December 2d?

9. At Demerara, on November 27th?

QUESTIONS FOR EXAMINATION IN SECTION IV.

What is the ecliptic? Why is it so called? What angle does it make with the equator? What is this angle called? Into how many parts or signs is it divided, and how many degrees does each contain? What are the names of the six northern signs? Write their characters. What are the names of the six southern signs? Write their characters. Name the spring, summer, autumnal, and winter signs. Which are the ascending, and which are the descending signs? What are the tropics, and at what distance are they from the equator? What are their names, and why are they so called? What is it that determines the distance at which they are drawn from the equator? What are the polar circles? At what distance are they from the poles, and at what distance from the equator? What are the equinoctial points? What are the solstitial points? What is meant by the sun's altitude? How often in the year are the days and nights equal to all places upon the earth? What are these days called? In what places of the earth are the days and nights always equal? Which is the longest day to all places in the northern hemisphere? What is this day called? Which is the shortest day to all places in the northern hemisphere? What is this day called? Which is the longest and which is the shortest day to all places in the southern hemisphere? During what time are the days constantly increasing to all places in the northern hemisphere? During what time are the days continually increasing in the southern hemisphere? What time of the year is the sun's declination north? How is the sun's place in the ecliptic found? How is the sun's de clination found? On what two days of the year is the sun's declination greatest, north or south? On what days has the sun no declination? How is the globe rectified for the sun's place and day of the month? How are the rising and setting of the sun found by the globe? How is the length of the day and night found? How is the sun's meridian altitude found for any given day at any given place? How is the sun's altitude for any hour of the day found? Having the sun's meridian altitude, how is the latitude found? How is it found when the sun is due east or west at any given place?

QUESTIONS FOR EXERCISE IN SECTION IV.

1. At what hour does the sun rise at N. Cape, Dec. 21st?
2. Is June 21st longer at Jerusalem or Newcastle, and how much?
3. At which of these places is Dec. 21st the longest?
4. Which is the longest day to Quito?
5. The difference between the longest and shortest day at Paris?
6. What is the sun's m. altitude at St. Petersburg, June 21st?
7. How high will the sun ascend on Christmas day at Bastia?
8. How high will the sun ascend at Samarcand on Sept. 29th?
9. The sun's altitude June 21st at North Cape at midnight?
10. What is the sun's altitude at Moscow, at 8 *a.m.* May 1st?
11. When does the sun rise due east at Carlisle?
12. What time does the sun rise and set at St. Petersburg, Naples, and Canton, on January 24th?
13. At what hour does the sun rise and set at Dublin, Gibraltar, Teneriffe, and Vienna, April 15th, July 4th, and Nov. 20th?
14. What is the length of the day and night on April 22nd, at London, Madrid, and Batavia?
15. What is the length of the day and night on June 10th, at St. Helena, Mexico, New York, and Canton?
16. What is the sun's declination, June 14th, and Aug. 31st?
17. What is the sun's m. altitude at London, on October 26th?
18. Give the sun's alt. at London, May 21st, at 9 *a.m.*?
19. What is the sun's alt. at Newcastle, May 21st, at 9 *a.m.*?
20. The sun's altitude at Constantinople, June 4th, at 3 *p.m.*?
21. How much longer is June 5th at Archangel than at Madras?
22. What is the sun's greatest altitude in Magalhaen's Strait?
23. What is the sun's least meridian altitude at Stockholm—at Malta—at Warsaw?

SECTION V.

DEFINITIONS.

1. The surface of the earth is divided into five *zones.*

2. The *torrid zone* is that space of the earth in between the tropics.

It is bounded by the tropic of cancer on the north, and the capricorn on the south: its breadth is 46° 56′, that being the of the tropics from each other.

3. The two *temperate zones* are those parts l tween the tropics and polar circles.

The north temperate zone is bounded on the south by the cancer, and on the north by the arctic circle; its breadth that being the distance between the tropic of cancer and circle. The south temperate zone is bounded on the nor tropic of capricorn, and on the south by the antarctic circle: i is the same as that of the north temperate zone.

4. The two *frigid zones* are those spaces i within the polar circles.

These circles are at the same distance from the poles as t from the equator, viz., 23° 28′.

5. If the latitude of any place be less than 23½ in the torrid zone; if it be more than 23½° and le 66½°, it is in one of the temperate zones; and more than 66½°, it is in the frigid zone.

6. The inhabitants of these zones are distinguis the different direction of their shadows.

Those who live in the torrid zone are called *amphiscii*; tha ing both kinds of meridian shadows. Twice in the year they shadow at noon, and are then called *ascii*.

Those who live in the temperate zones are called *heteroscii* having only one kind of meridian shadow. Those who live in temperate zone have their shadows at noon always towards th and those in the north temperate zone always towards the nort

Those who live in the frigid zones have, when their days than 24 hours long, the sun, and therefore their shadows, m around them; hence they are called *periscii*.

7. The sun is said to be *vertical* when it is in the or directly over head.

OF THE APPEARANCES OF THE SUN IN THE SEVERAL

To all places in the torrid and temperate zones, t rises and sets daily.

To all places in the frigid zones the sun, in summer, es not set for a certain number of days; nor rise in inter for the same number of days: at other times of the ar it rises and sets daily.

To all places in the torrid zone the sun is vertical at noon ice in the year: thus an inhabitant of the equator has e sun vertical when it is in the equinoctial. And, at any her period, the places to which the sun is vertical are ose whose latitude is equal to the declination of the n, and of the same name with it; thus, at 10° N. latitude e sun is vertical when its declination is 10° N.

This may be further illustrated by observing, that the equator and uinoctial coinciding (i. e., the equinoctial being nothing more than e equator supposed to be continued to the heavens) when the sun is the equinoctial, a perpendicular ray, coming from it to the earth, ll fall upon the equator: and during a diurnal revolution of the earth, e equator will be formed or passed over by this ray. When the sun not in the equinoctial, the perpendicular ray will fall as far to the rth or south of the equator as the sun is distant north or south of the uinoctial; and during a diurnal revolution of the earth, that parallel latitude will be described by this ray whose distance from the equator equal to the sun's declination, and of the same name with it.

Whilst the earth, in its annual motion round the sun, is oving from cancer to capricorn, the sun appears to move om capricorn to cancer; hence its declination varies om 23½ S. to 23½ N.: and during that time, or in half a ear, its rays will have been successively perpendicular to ll places in the torrid zone.

Whilst the earth is moving through the other half of its rbit from capricorn to cancer, the sun appears to move rom cancer to capricorn, and varies in declination from 3½ N. to 23½ S.; it will be vertical to the same places, ut in a retrograde order.

The tropic of cancer is the most northern circle de-cribed by the vertical rays of the sun; that of capricorn he most southern.

The sun is vertical only once a year at the tropics; at the tropic of cancer on June 21st, and at the tro capricorn on December 21st.

All places out of the torrid zone, being at a great tance from the equator than the sun's greatest decli can never have the sun vertical.

From the ecliptic being drawn upon the terrestrial globe, pupil knowing that it is the line in which the sun appears to m may be inclined to suppose that the sun moves daily round the the oblique manner in which the ecliptic is drawn.

To correct this false notion, it may be observed, that the ecli circle peculiar to the celestial globe, where it really marks out t apparent path among the stars; but on the terrestrial globe it other use than to find the sun's declination on any day.

The sun's vertical rays form a sort of spiral line from tropic to This may be explained by supposing a quantity of silk strin wrapped round the globe, from one tropic to the other. If the s be so contrived as to be thicker towards the equator, where the d ference of declination is greatest; and if the number of times it to be wrapped round, before it covers the space between the tro equal to half the number of days in one year, it will exactly r the spiral line formed by the rays of the sun in six months. other six months the same sort of spiral line will be formed i trary direction.

PROBLEM XXII.

A place being given in the Torrid Zone, to find th days of the year in which the Sun is vertical to that

By the Globe.—1. Bring the given place to th ridian, and mark its latitude.

2. Turn the globe round, and observe the two po the ecliptic that pass under this mark; the calend shew the days corresponding to these points,—whi be the answer required.

Or, having found the latitude of the place, bri *analemma* to the meridian, then directly below the la will be found the days required.

Without the Globe.—1. Find the latitude, eithe a table of latitudes and longitudes, or from maps.

2. Observe in White's Ephemeris, or in Table I.

nd of this work, on what two days of the year the sun's eclination is equal to the latitude, and of the same name ith it: these are the days required.

The examples to this problem may be proved by the following meod. Find how many days there are from the time when the sun is ertical to the nearest solstice, and also how many there are from that olstice to the time when it is vertical again: if the number of days be qual, the solution is right.

EXAMPLES.

On what days is the sun vertical to the following places?

1. Otaheite? *Answ.* Jan. 30 and Nov. 11.
2. Rio Janeiro. Jan. 2 Dec. 9.
3. St. Helena.
4. Batavia.
5. Bencoolen.
6. Quito.
7. Borneo.
8. Pelew Islands.
9. Sierra Leone.
10. Tobago.
11. Port Royal.
12. Bombay.
13. Canton.
14. Friendly Isles.
15. Trincomalee.
16. Guadaloupe.
17. Porto Bello.
18. Vera Cruz.
19. Tinian Isle.
20. Manilla.
21. Columbo.
22. Santa Fé de Bogotà

PROBLEM XXIII.

To find all those places in the Torrid Zone to which the Sun is vertical on a given day.

Find the sun's declination for the given day, and mark he declination, then turn the globe round, and all those laces which pass under that mark of the meridian will ave the sun vertical on the given day.

EXAMPLES.

1. To what places is the sun vertical Nov. 10th?

Answ. To Otaheite, the Great Cyclades, and New Hebrides, in the South Sea; Cape Grafton, in New South Wales; the Island of Madagascar; Monomotapa and

Mataman, in Africa; Punta Gorda, in Brazil; and the southern parts of Amazonia and Peru, in South America.

2. To what places is the sun vertical on February 2nd? *Answ.* To the same as in the last example.

To what places is the sun vertical—

3. On April 16 and Aug. 28 ?
4. At the summer solstice?
5. March 21 and Sept. 23?
6. May 16 and July 29?
7. Winter solstice?
8. May 1?

PROBLEM XXIV.

The day and hour at any place being given, to find where the Sun is then vertical.

Find the sun's declination, and by Prob. XIII. the places where it is noon at the time; then of those places where it is noon, that will have the sun vertical, whose latitude is the same as the declination.

EXAMPLES.

1. To what place is the sun vertical, when it is 39 min. past 6 *a.m.* at London, August 18th ? *Answ.* Madras.

2. Where is the sun vertical on the 24th of October, when it is 29 min. past 7 *p.m.* at Jerusalem? *Ans.* Lima.

Having the times given at the following places, where is the sun then vertical?

3.	September 23,	6 50 *a.m.*	Bagdad.
4.	August 1,	5 0 *p.m.*	Bristol.
5.	April 30,	1 53 *p.m.*	Amsterdam.
6.	June 21,	Noon	Canton.
7.	September 9,	6 30 *a.m.*	Jerusalem.
8.	March	0 30 *p.m.*	Canton.
9.	May 4,	8 10 *a.m.*	Vienna.
10.	May 20,	11 43 *p.m.*	Calicut.
11.	January 1,	6 0 *p.m.*	Mexico.
12.	February 12,	9 0 *a.m.*	Dublin.
13.	July 28,	5 16 *p.m.*	Port Royal.
14.	March 11,	6 10 *a.m.*	Malta.

15. December	9,	3 0 *p.m.*	London.
16. September	2,	3 0 *a.m.*	London.
17. November	6,	1 37 *p.m.*	C. of Good Hope.
18. July	28,	8 15 *a.m.*	Vienna.
19. December	21,	1 56 *a.m.*	London.

PROBLEM XXV.

Having the hour given at any place, on any given day, to find where the Sun is rising, where it is setting, where it is noon, and where it is midnight.

Find, by Problem XXIV., the place to which the sun is then vertical; elevate the globe for that place, and bring it to the meridian.

Then, to all those places in the western semicircle of the horizon, the sun is rising; to those under the upper semicircle of the meridian it is noon; to all places in the eastern semicircle of the horizon the sun is setting; and to those under the lower semicircle of the meridian it is midnight.

EXAMPLES.

1. At what places is the sun rising on June 4, when it is 4 *p.m.* at London? *Ans.* At the north-east part of Siberia; at Kamtchatka; at the most westerly of the Sandwich Isles; and the most easterly of the Society Isles.

Where is it noon at the same time?

Ans. At Baffin's Bay, New Britain, Martinique, Trinidad, and the middle part of South America.

At what places is the sun then setting?

Ans. At Tobolsk, the Caspian Sea, Desert of Arabia, the middle of the Red Sea, Abyssinia, the unknown parts of Africa, and the country of the Hottentots.

At what places is it midnight at that time?

Ans. At Chinese Tartary, the eastern part of China, the Philippine Isles, and the western part of New Holland.

2. On April 27th, 6 hrs. 45 min. *a.m.* at Newcastle,

required the places to which the sun is rising and setting: also where it is noon and midnight.

Answ. Rising—Greenland, the Azores, Cape Verd Isles, Ascension Isle. *Setting*—Aleutian Islands, Queen Charlotte's Islands, eastern coast of New Holland. *Noon*—Middle of Siberia, middle of the western Peninsula of India. *Midnight*—Middle of N. America, Mexico.

3. To what places is the sun rising and setting July 27, when it is 2 hrs. *a.m.* at Pico (Azores); and where is it noon and midnight at the same time?

4. May 24, 8 *p.m.* at Newcastle, where is the sun rising and setting, and where is it noon and midnight?

5. At what places is the sun rising and setting, and where is it noon and midnight, when it is 10 *p.m.* at Botany Bay on August 15th?

6. April 4th, 6 *a.m.* at Edinburgh, where it is noon, midnight, sun-rise, and sun-set?

7. June 9th, 3 *a.m.* at Glasgow, where is it noon and midnight, and where is the sun rising and setting?

8. Midnight at Singapore Sept. 15, where is the sun vertical, and where is it rising and setting?

PROBLEM XXVI.

A place being given in the North Frigid Zone, to find when the Sun begins to appear, and when to disappear; also the Length of the longest Day and Night.

By the Globe.—1. Elevate the globe for the latitude, and bring the ascending signs to the south point of the horizon: observe what degree of the ecliptic is cut by that point, and find, on the calendar, the day of the month answering to that degree; this will be the time of the sun's beginning to appear above the horizon at the given place; which is the end of the longest night.

2. Bring the descending signs to the south point of the horizon, and the day answering to the degree of the

ecliptic cut by it, will be that on which the sun disappears, which is the beginning of the longest night.

3. Bring the ascending signs to the north point of the horizon; and the degree of the ecliptic, noted as above, will show when the sun begins to shine continually; which is the beginning of the longest day.

4. Bring the descending signs to the same point, and in the same manner it will be found when the sun ceases to shine continually, or the end of the longest day.

5. From the end of the longest night to the beginning of the longest day, and conversely, the sun rises and sets daily.

By the Analemma.—1. Elevate the globe for the latitude, and bring the analemma to the south point of the horizon, then the two days of the month on the analemma cut by the horizon, will be the beginning and end of the longest night.

2. Bring the analemma to the north point of the horizon, and you will find in the same manner the beginning and end of the longest day.

Without the Globe.—1. Subtract the latitude from 90°; the remainder is called the *co-latitude.*

2. The sun being in the ascending signs, find, by the table, on what day its declination is equal to the co-latitude, but of a *contrary* name; this will be the day on which the sun first appears above the horizon: find the same when the sun is in one of the descending signs: this will be the day on which it entirely disappears.

3. Find, in the same manner, the two days when the sun's declination is equal to the co-latitude, and of the *same* name with it: the one will be the beginning, and the other the end, of the longest day.

EXAMPLES.

1. Whale Island, discovered by Mackenzie, lies in lat. 69° 14′ N.; required the time when the sun first appears

above the horizon, and when it disappears; also the length of the longest day and night there.

Here 69° 14′ being taken from 90°, leaves 20° 46′ for the co-latitude. The two days on which the sun's declination is 20° 46′ S. (of a contrary name to the latitude) are Jan. 17th and Nov. 25th; the former is the day on which the sun first appears above the horizon, the latter that on which it disappears.

The two days on which the sun's declination is 20° 46′ N. (of the same name with the latitude) are May 24th and July 20th; the former is the beginning, and the latter the end, of the longest day.

Hence, at Whale Island, the sun first appears Jan. 17th, and rises and sets daily till May 24th,—a space of 127 days: it continues above the horizon from May 24th to July 20th; therefore the longest day there is equal to 57 natural days. From July 20th it rises and sets daily to Nov. 25th, 128 days, and never rises again till Jan. 17th; so its longest night is equal to 53 days.

2. When does the sun begin to appear above the horizon at North Cape, in Lapland, lat. 71° 10′ N.; when does it disappear; and how many days are the inhabitants without seeing the sun?

Ans. The sun appears Jan. 26, and rises and sets daily till May 15; after which time it continues above the horizon till July 29; then it rises and sets daily till Nov. 16, when it disappears till Jan. 26; the length of the longest night is therefore equal to 71 days.

3. When does the sun begin to appear at South Cape, in Spitzbergen, lat. 76° N.; when to disappear; and what is the length of the longest day there?

4. The most northerly land discovered are seven islands, called the *Seven Sisters*, that lie to the north of Spitzbergen, in lat. 81° N. Captain Phipps, in his voyage towards the North Pole, was so completely surrounded with ice at this place, that he and all the ship's company were for some time under the dreadful apprehension of being obliged to pass the winter here. How long would they have been without seeing the sun?

5. How long is the longest day at the North Pole?

6. In 1819-20, Captain Parry wintered at Melville Island, in the Polar Sea, lat. 75°; how many days were he and his men deprived of the light of the sun?

7. In 1827, Captain Parry, in his attempt to reach the North Pole, advanced as far as 82° 45′ North; required the length of the longest day there?

PROBLEM XXVII.

To find in what Latitude, in the North Frigid Zone, the Sun begins to shine, without setting, on any given day.

Find the sun's declination on the given day, subtract it from 90°, and the remainder will be the latitude required.

The given day must be between March 21st and June 21st.

In the same manner it may be found in what latitude, in the south frigid zone, the sun begins to shine, without setting, on any given day between Sept. 23d and Dec. 21st.

EXAMPLES.

1. In what latitude does the sun begin to shine without setting on April 23? *Ans.* 77° 31′ N.

2. May 15?	5. April 2?
3. June 1?	6. Nov. 5?
4. June 21?	7. Dec. 1?

PROBLEM XXVIII.

Having the length of the longest Day in any place, to find the Latitude of that Place.

By the Globe.—1. Bring the first of cancer to the meridian, and set the index to 12.

2. Turn the globe westward till the index point to the hour of setting, which is equal to half the length of the day.

3. Raise or depress the pole, till the sun's place be observed to be exactly in the western horizon; the elevation of the pole will give the latitude of the place.

By this problem it may be found in what latitude any day is of a given length, by bringing the sun's place for the given day to the meridian, and proceeding as above.

The examples in this problem may be proved by Problem XVII.

EXAMPLES.

1. In what latitude is June 21st 16 hours long?
Ans. Lat. 49° N.

2. Where 18 hours long? *Ans.* Lat. 58½° N.

3. Where is Dec. 1st 14 hrs. long? *Ans.* Lat. 32° 46′ S.

4. In what latitudes is January 21st—
5 hours long? 10 hours? 16 hours?
7 hours? 12 hours? 18 hours?

5. In what latitudes is February 20th—
7 hours long? 11 hours? 15 hours?

6. In what latitudes is May 15th, or July 29th—
6 hours long? 9 hours? 14 hours? 18 hours?

PROBLEM XXIX.

To find the Latitudes of those places in the Frigid Zone where the Sun does not set for a given number of Days.

1. Take half the number of the days, and count as many degrees from the first of cancer towards the equinoctial point.

2. Bring the point thus arrived at to the brass meridian, and observe the degree cut by it.

3. Subtract this from 90°, and the remainder will be the latitude of the place.

The above method is not perfectly correct, because the sun does not advance one degree in the ecliptic every day, but takes 365¼ days to move through the whole 360 degrees in the ecliptic.

EXAMPLES.

1. In what latitude does the sun shine continually for 50 days? *Ans.* 69°.

2. In what latitude does it shine for 76 days? *Ans.* 71° 30′.

3. In what latitude does the sun shine continually for 1 month; for 2, 3, 4, 5, and for 6 months?

QUESTIONS FOR EXAMINATION IN SECTION V.

Into how many zones is the earth divided? What are the boundaries of the torrid zone? What is its breadth? How are the two temperate zones situated? What is the breadth of each? What lines are the boundaries of the frigid zones? In which of the zones does the sun rise and set daily? In which does it not set for a certain number of days in summer, or rise for a certain number of days in winter? What is meant by the sun's being vertical? In which of the zones is the sun

al twice a year? At what hour of the day is the sun vertical to
lace? How often in the year is the sun vertical to places in the
temperate zone? How often is the sun vertical at the tropics?
hat tropic is the sun vertical on June 21st? At what tropic is the
ertical on December 21st? Why is the sun never vertical to
s that are not in the torrid zone? How is it found on what
days of the year the sun is vertical to any place in the torrid
? How is this found without the globe? How may the ex-
es be proved? How are the places found to which the sun
tical on any given day? Having the day and hour given, how is
nd where the sun is then vertical? A place being given in the
frigid zone, how is it found when the sun begins to appear above
orizon, and when it begins to disappear; also, the length of the
st day and night? On any given day between the vernal equinox
ummer solstice, how is it found in what latitude in the north frigid
the sun begins to shine without setting?

QUESTIONS FOR EXERCISE IN SECTION V.

To what places will the sun be vertical on April 9th?

On March 12th?

On August 15th?

When will the sun pass vertically over Surinam?

When will the sun pass vertically over the islands of Ascension,
itius and Guam?

On what two days in the year will a person at St. Christopher's
no shadow at noon?

To what place will the sun be vertical on January 31st, when it
n the morning at Newcastle?

On June 14th, when it is ½-past 8 in the morning at Newcastle,
e is the sun vertical?

what places will the sun be vertical—

On July 12th, when it is 9 in the evening at Jerusalem?

. On the 26th of June, when it is 7 *a.m.* at London?

. On July 10th, when it is 2 in the morning at Quebec?

. On Christmas-day, when it is midnight at Petersburg?

. On November 10th, when it is 6 in the evening at Ormus?

. Is the sun ever vertical at Jerusalem?

. Is the sun ever more than 24 hours above the horizon at Arch-
l?

. Suppose a person to pass the winter in 77° N. latitude, how
would he be without seeing the sun?

. In what latitude does the sun begin to shine, without setting,
ay 1st?

SECTION VI.

DEFINITIONS.

1. *Twilight* is that medium between light and darkness which happens before sunrise, and after sunset.

2. The *crepusculum* is a circle parallel to the horizon, and 18° below it, where the twilight begins and ends.

Of Twilight.—As soon as the sun comes within 18° of the horizon, its rays strike the higher parts of the atmosphere, and, being refracted and reflected to every part, occasion that agreeably gradual transition from darkness to light, called *twilight.*

In the same manner in the evening, after the sun sets, its rays strike upon the higher parts of the atmosphere, until it is more than 18° below the horizon : this prevents us from being suddenly deprived of the light of the sun.

The benefits of twilight are obvious. A change so great, as from the darkness of midnight to the splendour of noon-day, would probably be injurious to the sight; and it would be unpleasant to all, and in many cases very dangerous to travellers, to be involved in darkness without timely notice of its approach.

In countries near the equator, twilight is of much shorter duration than it is in countries of high latitudes; for at the equator the sun rises and sets perpendicularly, and consequently the twilight there cannot be greater than 1 hour 12 minutes,—but to places at a great distance from the equator it rises and sets very obliquely; and hence it requires a longer time to go 18° below the horizon.

At the latitude of 49° N. twilight continues the whole night on June 21st; and, at places still farther north, it continues the whole night, for a certain number of days before and after the summer solstice. At London there is no total darkness from May 28th till July 20th.

Twilight continues, at the north pole, from September 23rd, when the sun sets, to November 12th,—a space of 51 days. Twilight first appears again there about the 30th of January, and continues till sunrise on March 21st. Thus, though the inhabitants (if any) at the north pole never see the sun for 6 months, yet, out of that time, they have twilight for 14 weeks. The time that they receive no light from the sun is only 12 weeks; and during that time the moon is 6 weeks above the horizon.

PROBLEM XXX.

To find at what place it is Twilight at any given time.

Find where the sun is then vertical, and elevate the globe for that place. Observe what places are less than 18° below the horizon; to those below the western semicircle it is twilight in the morning, and to those below the eastern semicircle it is twilight in the evening.

Otherwise.—Elevate the globe for the antipodes of the place to which the sun is then vertical, and observe what places are within less than 18° above the horizon.

EXAMPLES.

1. On March 10th, when it is 11 *p.m.* at New Orleans, where is it twilight?

Ans. Morning.—Britain, France, middle of Africa.

Even. Twilight.—Society and Sandwich Isles, Alaska.

2. When it is 6 hrs. 45 min. *a.m.* at Newcastle on April 27th, where is it twilight? *Ans. Morning*—Labrador, Newfoundland. *Evening*—Alaska, New Hebrides, New Caledonia, part of New Zealand.

3. Where is it twilight, when it is 3 o'clock *p.m.* at London, on June 4th?

4. On September 25th, when it is 10 *p.m.* at Trinidad?

5. Dec. 16th, when it is noon at Easter Island?

6. On April 4th, when it is 6 *a.m.* at Edinburgh?

7. On June 9th, when it is 3 *a.m.* at Glasgow?

8. On March 24th, when it is 4 *p.m.* at Benares?

PROBLEM XXXI.

To find the Duration of Twilight on a given day.

1. Elevate the globe for the latitude of the place, bring the sun's place to the meridian, and set the index to 12.

2. Turn the globe till the sun's place be 18° below the horizon, and the index will show the beginning of twilight; or that point in the ecliptic, opposite to the sun's place, may be brought 18° above the western horizon.

3. Subtract the commencement of twilight from the time of the sun's rising, (see Problem XVII.,) and the remainder will be the duration of twilight.

EXAMPLES.

How long does twilight continue at London on—

1. March 2d? *Ans.* 1 hr. 50 min.
2. June 21st? *Ans.* No night.
3. September 25th? *Ans.* 2 hrs. 0 min.
4. December 26th? *Ans.* 2 10

How long does twilight continue on March 21st at—

5. Cape of Good Hope?
6. Quito?
7. Jerusalem?
8. Vienna?
9. Petersburg?

How long will it continue on June 21st at—

10. Cape Horn?
11. Gilolo Isle?
12. Formosa Isle?
13. Pekin?
14. St. Petersburg?
15. Cairo?

PROBLEM XXXII.

To find at what places an Eclipse of the Moon is visible.

Find, by Problem XXIV., the place to which the sun is vertical at the given time. Elevate the globe for the antipodes of that place, and bring the antipodes to the meridian: then, to all the places which are above the horizon, the eclipse will be visible.

At an eclipse of the moon, the sun and moon are in opposite points of the ecliptic; and the place to which the moon is then vertical is the antipodes of that to which the sun is vertical.

EXAMPLES.

1. On May 10th, 1808, there was a total eclipse of the moon when it was 8 o'clock in the morning at Greenwich; where was it visible? *Ans.* N. and S. America, the islands in the Pacific Ocean, east coast of New Holland.

2. On April 30th, 1809, there was an eclipse of the sun when it was 1 *a.m.* at London; where was it visible?

3. In 1811, March 10th, there was an eclipse of the moon, at 6½ *a.m.* at London; where was it visible?

4. Aug. 22nd, 1812, there was an eclipse of the moon when it was 3 *p.m.* at London; where was it visible?

QUESTIONS FOR EXAMINATION IN SECTION VI.

What is it that produces twilight? In what countries is twilight of the shortest duration? In what latitude does twilight continue the whole night on June 21st? How long does twilight continue the whole night at London, and places of the same latitude as London? How is it found where it is twilight at any given time? How is the duration of twilight found at any place on any given day? How is it found where an eclipse of the moon is visible?

PART III.

CONTAINING PROBLEMS ON THE CELESTIAL GLOBE.

DEFINITIONS.

1. THE *celestial globe* is an artificial representation of the heavens, having the fixed stars delineated upon it, in their natural order and situation.

The celestial globe is not so exact a representation of the heavens as the terrestrial globe is of the earth; because the stars are drawn upon a convex surface, and they appear in the heavens in an inverted order on a concave surface: but suppose the globe were made of glass, then, to an eye placed in the centre, the stars drawn upon it would appear on a concave surface, just as they do in the heavens.

2. The *solar system* consists of the sun and all those bodies which revolve round it. These are the planets, with their satellites and the comets.

3. The *fixed stars* are those bodies which shine by their own light, and are not subject to motion.

The term fixed stars is not strictly correct. Many of the stars are known to have a proper motion through space; and several even of the double stars, besides revolving round each other, are transferred, without parting company, by a progressive motion common to both, towards some determinate region. It becomes an interesting question—Does our sun move in an immense orbit of its own, carrying the whole solar system with it?

4. A *constellation* is a group of stars.

5. *Planets* are opaque bodies which only shine by reflecting the light of the sun.

The name is derived from the Greek ϖλανητης (a wanderer). A planet does not twinkle as the fixed stars do.

6. *Secondary planets*, or *satellites*, are the moons which revolve round the primary planets, as those bodies revolve round the sun.

7. *Comets* consist for the most part of a large and splendid, but ill defined, nebulous mass of light, called the head; from which there usually proceeds, in a direction opposite to the sun, a stream of light called the tail.

8. The *celestial poles* are the extremities of the earth's axis produced to the heavens: they are those two points round which the stars appear to revolve.

9. The *equinoctial* is the equator supposed to be continued to the heavens.

10. *Parallels of declination* are small circles drawn parallel to the equinoctial; or, they are the parallels of latitude supposed to be continued to the heavens.

11. *Celestial meridians* are lines drawn from pole to pole, directly across the equinoctial; they are also called *circles of declination;* or, they are the terrestrial meridians supposed to be continued to the heavens.

12. The *declination* of the sun, moon, or stars, is their distance north or south from the equinoctial.

13. *Right ascension* is that degree of the equinoctial which comes to the meridian with the sun, moon, or stars, reckoning eastward from the first point of Aries; or it is that degree which comes to the horizon with the sun, moon, or stars, in a right sphere.

14. *Oblique ascension* is that degree which comes to the horizon with the sun, or a star, in an oblique sphere.

15. *Ascensional difference* is the difference between the right and oblique ascension. Expressed in time, it gives the sun's rising before or after 6 o'clock.

16. *Right descension, oblique descension,* and *descensional difference,* have the same reference to the setting of the sun, or of a star, as the above terms have to rising.

17. The *latitude* of any celestial body is its distance north or south from the ecliptic.

18. *Parallels of celestial latitude* are small circles parallel to the ecliptic.

19. The *longitude* of any celestial body is its distance from the first point of Aries, reckoned eastward in signs, degrees, and minutes, upon the ecliptic.

The latitude and longitude of celestial bodies have the same reference to the ecliptic, as the lat. and long. of places upon the earth have to the equator; the longitude is reckoned all round to 360°.

20. The *rising* of any celestial object is when its centre appears in the eastern part of the horizon; *culminating* when it comes to the meridian, and its *setting* when its centre disappears in the western part of the horizon.

21. *Azimuth,* or *vertical circles,* pass through the zenith and nadir, and are perpendicular to the horizon.

22. The *prime vertical* is that vertical circle which passes through the east and west points of the horizon.

If the quadrant of altitude be fixed upon the zenith, and brought to any part of the horizon, it will represent the quadrant of a vertical circle; if brought to the east or west point of the horizon, it will represent the quadrant of the prime vertical.

23. *Azimuth* is the distance of a vertical circle passing through any celestial object, from the north or south point of the horizon, and is either easterly or westerly.

24. *Amplitude* is the distance of any celestial object from the east or west point of the horizon, at the time of rising or setting,—and is either north or south.

The azimuth and amplitude are both found upon the wooden horizon; the amplitude being numbered from the east and west points towards the north and south, and the azimuth from the north and south points towards the east and west. If the azimuth be not marked upon the horizon, it may be found from the amplitude, being its complement, or what it wants of 90°.

25. The *zodiac* is a zone which surrounds the heavens, extending 8° on each side of the ecliptic: it contains 12 constellations, each bearing the name of some object,—from which the signs of the ecliptic have their names.

26. The *altitude* of any celestial object is the arc of a vertical circle, intercepted between the centre of the object and the horizon.

27. The *zenith distance* is an arc of a vertical circle contained between the centre of a celestial object and the zenith; or it is what the altitude wants of 90°.

28. The *meridian* altitude, or zenith distance, is the alt. or zenith dist. when the object is in the meridian.

29. *Orbit* is the path which a body describes in its revolution round the sun.

30. A body is in *conjunction* with the sun when it has the same longitude, and in *opposition* when the difference of longitude is 180°. The *occultation* of a star or planet is its eclipse, occasioned by the interposition of the moon or other planet between the earth and it.

31. The *geocentric* place of a planet is its place in the heavens as seen from the earth; the *heliocentric* place is its place as seen from the sun.

32. *Disc* of the sun or moon is its round face, which, from the great distance of the object, appears flat.

33. A *digit* is the twelfth part of the diameter of the sun and moon.

Geometrical Definitions.

1. A *great circle* divides a globe into two equal, *a small circle* into two unequal parts.

2. A *right* or *direct sphere* is that which has the poles in the horizon, and the equinoctial and parallels of declination perpendicular to it.

3. An oblique sphere is that which has one of the poles elevated above the horizon less than 90°, and the other depressed below it; the

equinoctial and parallels of declination form with the horizon oblique angles.

4. A parallel sphere is that which has the equator in the horizon and the poles in the zenith and nadir.

SECTION I.

OF THE STARS.

A clear winter evening affords one of the most brilliant prospects in nature. The canopy of the heavens is covered with an innumerable multitude of stars, some shining with greater, and others with less, splendour.

To the eye they appear to be all placed at the same distance from the earth; and their different apparent magnitudes and brightness we are apt to attribute to the size of the bodies themselves, rather than to the different distances at which they are placed. From the irregular manner in which they seem scattered about, as well as from their apparently infinite numbers, any attempt to arrange them in classes, or to count their numbers, would at first view appear impossible. Yet we find that this was done in the very infancy of astronomy. The shepherds of Chaldea are supposed to have been the first who directed their attention to this subject: the nature of their employment invited them to the work, and the continued serenity of their sky enabled them to pursue it without interruption. In the time of Job some of the constellations were well known; hence the following apostrophe, "Canst thou bind the sweet influences of Pleiades, or loose the bands of Orion? Canst thou bring forth Mazzaroth in his season? Or canst thou guide Arcturus with his sons?" Stars continue visible through telescopes during the day as well as the night; from the bottoms of deep narrow pits bright stars may be discerned by the naked eye.

Astronomers, to assist the imagination and the memory in conceiving and retaining the number and position of the stars, divided them into certain groups, called *constellations*, which, by a stretch of fancy, they supposed to resemble the figure of a man, or other object.

The number of the ancient constellations was 48, but the present number upon the globe is 70, though, by some, it amounts to 91; of which 34 belong to the northern hemisphere, 12 to the zodiac, and the remaining 45 to the southern hemisphere: those stars which do not come into any of the constellations are called *unformed stars*.

Stars are further divided into classes according to their apparent size. The largest are said to be of the first magnitude, the next in size of the second magnitude, and so on. The individual stars in each constellation are marked with the letters of the Greek alphabet; the first letter, α, (alpha,) being put for the largest star in the constellation —the second letter, β, (beta,) for the next largest—γ, (gamma,) for the next—δ, (delta,) ε, (epsīlon,) ζ, (zeta,) η, (ēta,) for the next—and so on; and when there are more stars in a constellation than letters in the Greek alphabet, the rest are marked by italic letters. This serves to point out the stars, as well as if particular names were given to each. But, besides this method of distinguishing them, some of the most remarkable have proper names assigned them.

The lowest magnitude visible to the naked eye is the sixth, but astronomers carry the classification of the stars as far as the sixteenth magnitude. All the stars of the same magnitude do not possess equal brilliancy. Thus some stars, said to be of the first magnitude, are scarcely superior to the brightest of the second magnitude, or the feeblest of the second to the brightest of the third, and so on.

The following is a catalogue of the stars in each constellation, with the names of the most remarkable stars.

The figures placed against each constellation denote the number of stars composing it, and the figure attached to each principal star marks its magnitude.

1. CONSTELLATIONS NORTH OF THE ZODIAC.

1.	Ursa Minor	The Little Bear	24	Pole Star	2
2.	Ursa Major	The Great Bear	87	Dubhe	1
3.	Perseus	Perseus	59	Al′genib	2
	Caput Medusæ	Medusa's Head		Algol	2
4.	Auriga	The Waggoner	66	Capella	1
5.	Boötes	The Herdsman	54	Arcturus	1
6.	Draco	The Dragon	80	Ras′taben	2
7.	Cepheus		35	Aldera′min	3
8.	Canes Venatici	The Hounds	25		
9.	Cor Caroli	Charles's Heart	3		
10.	Triangulum	The Triangle	11		

iangulum Minus	The Little Triangle	5		
usca	The Bee, or Fly	6		
nx	The Lynx	44		
o Minor	The Little Lion	53		3
ma Berenices	Berenice's Hair	43		
melopardalus	The Camelopard	58		
ons Mænalus	Mount Mænalus	11		
rona Borealis	The Northern Crown	21	Gemma	2
rpens	The Serpent	64		2
utum Sobieski	Sobieski's Shield	8		
rcules	Hercules	113	Ras Al'gothi	3
hiuchus	Serpent Holder	74	Ras Alha'gue	2
urus Poniatowski	Poniatowski's Bull	7		
ra	The Harp	22	Vega	1
lpecula et Anser	The Fox and Goose	37		
gitta	The Arrow	18		
uila et Antinoüs	The Eagle	71	Altair, or Atair	1
lphinus	The Dolphin	18		
gnus	The Swan	73	Deneb (the tail)	1
uu'leus	The Colt	10		
certa	The Lizard	16		
gasus	The Flying Horse	89	Markab	2
dromeda		66	Alpheratz	2
ssiopeia	The Lady in the Chair	55	Schedir	3

2. CONSTELLATIONS IN THE ZODIAC.

ies	The Ram	66		2
urus	The Bull	141	Aldebaran	1
mini	The Twins	85	Castor & Pollux 1	2
ncer	The Crab	83	Acubens	4
o	The Lion	95	Regulus	1
rgo	The Virgin	110	Spica Virginus	1
bra	The Scales	51	Zubenel Genu'bi	2
orpio	The Scorpion	44	Antares	1
gittarius	The Archer	69		3
pricornus	The Goat	51		
uarius	The Waterbearer	108		1
sces	The Fishes	113		

3. CONSTELLATIONS SOUTH OF THE ZODIAC.

œnix	The Phœnix	13		
ficina Sculptoria		12		
id'anus	The River Po	84	Achernar	1

4.	Hydrus	The Water Snake	10	
5.	Cetus	The Whale	97	Menkar
6.	Fornax Chemica	The Furnace	14	
7.	Horologium	The Clock	12	
8.	Reticulus	The Net	10	
9.	Xiphias	The Sword Fish	7	
10.	Cela Praxitelis	The Gravers	16	
11.	Lepus	The Hare	19	
12.	Columba Noachi	Noah's Dove	10	
13.	Orion		78	Betelguese
14.	Argo Navis	The Ship Argo	64	Canopus
15.	Canis Major	The Great Dog	31	Sirius
16.	Equuleus Pictorius	The Painter's Easel	8	
17.	Monoceros	The Unicorn	31	
18.	Canis Minor	The Little Dog	14	Pro'cyon
19.	Chameleon	The Chameleon	10	
20.	Pyxis Nautica	Mariner's Compass	4	
21.	Piscis Volans	The Flying Fish	8	
22.	Hydra	The Hydra	60	Cor Hydræ
23.	Sextans	The Sextant	41	
24.	Robur Carolinum	The Royal Oak	12	
25.	Machina Pneumat.	The Air Pump	3	
26.	Crater	The Cup	31	Alkes
27.	Corvus	The Crow	9	Algorab
28.	Crux	The Cross	6	
29.	Musca Australis	The Southern Fly	4	
30.	Apus Indica	The Bird of Paradise	11	
31.	Circinus	The Compass	4	
32.	Centaurus	The Centaur	35	
33.	Lupus	The Wolf	24	
34.	Quadra Euclidis	Euclid's Quadrant	12	
35.	Triangulum Aust.	The Triangle	5	
36.	Ara	The Altar	9	
37.	Telescopium	The Telescope	9	
38.	Corona Australis	The Southern Crown	12	
39.	Pavo	The Peacock	14	
40.	Indus	The Indian	12	
41.	Microscopium	The Microscope	10	
42.	Octans Hadleianus	Hadley's Quadrant	43	
43.	Grus	The Crane	13	
44.	Toucan	The American Goose	9	
45.	Piscis Australis	The Southern Fish	24	Fomalhaut

OF THE NUMBER OF THE STARS.

The number of stars that can be seen at any one time, by the naked eye, does not exceed a thousand; though, from their twinkling, and the indistinct manner in which they are viewed, they appear to be innumerable.

But if we take into the account the stars that are visible through good telescopes, their number may be said to be almost, if not altogether, infinite. They are not equally distributed in the sky, but are chiefly crowded together in the region of the Milky Way.

The Milky Way is a broad track or path encircling the heavens; it is an assemblage of stars, too remote to be seen singly, but so closely disposed as to give a luminous appearance to that part of the heavens. In the Milky Way Dr. Herschel has, in a quarter of an hour, seen 116,000 stars pass through the field of view of his telescope. "In short," to use the words of Sir John Herschel, "the Milky Way, when examined through powerful glasses, is found to consist entirely of stars scattered by millions, like glittering dust, upon the black ground of the general heavens."

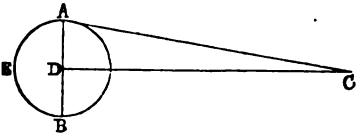
Astronomers have, however, not yet fathomed the sky; as more powerful telescopes are applied, stars unseen before burst upon the view.

OF THE DISTANCE OF THE STARS.

For a long time the only thing known respecting the distance of the stars was, that the nearest of them could not be less than 19 billions of miles distant from us, how much more was not known. From the observations of Bessel, a Prussian astronomer, it is now rendered probable that the distance is three times that amount, or upwards of 57 billions of miles.

The swiftest motion we are acquainted with is that of light, which moves at the rate of twelve millions of miles in a minute. Though flying with this inconceivable velocity, it will require ten years to traverse the space which separates us from the nearest fixed star. If the opinion of astronomers be correct, that stars of the second magnitude are twice the distance of those of the first, the third at twice the distance of the second, and so on, how great the distance of those which are just perceptible! The light that strikes upon our eyes from the Milky Way on a winter's night must have left the luminaries which afford it upwards of a thousand years ago A cannon-ball, with its rush of 20 miles a minute, would require five and a half millions of years to travel from the nearest fixed star to us.

The method of ascertaining the distance of the stars depends upon the determination of their annual parallax. The process may be thus explained:



A person standing at A, on the margin of a circular lake, A E B, will see a tree at C in a different direction from a person situated at the centre, D. The difference of direction being ascertained, or, in other words, the angles C A D and C D B being measured, and the length of A D being taken, the distance of the tree at C, or the length of the line C D can readily be found by a trigonometrical process. The angle A C D is denominated the *parallax* of the object at C, with respect to the observers at A and D. It is evident that the further the object at C is removed from the spectators the less this parallax will become.

Let us apply this illustration to astronomical purposes, and suppose the circle A E B to represent the earth, and the point C a fixed star. It might be expected that rays of light from the star at C would strike a spectator at A, and another, supposed to be at the centre D, in different directions; or, in other words, that the delicate instruments and practised eyes of astronomers would be able to detect some difference between the angles C A D and C D B. But they have not. The line A D, therefore, or the radius of the earth, 4,000 m., is nothing in comparison with D C, the distance of the star at C from the centre of the earth.

Next let the circle A E B represent the earth's orbit. The angle A C D is in this case called the *annual* parallax. Now, although the point A is distant from D 95 millions of miles, astronomers for a long time could not detect any parallax. They measured the angles subtended by a particular star at all seasons of the year, or, in other words, from all points of the earth's orbit, without observing any difference. At length Professor Bessel has found the parallax of the star, 61 Cygni, to be about one-third of a second. Confidence is placed in his observations, but as the angle is so very minute, the confirmation of his result is looked for with interest.

Owing to the extreme distance of the stars, their discs or bodies cannot be rendered visible by the most powerful telescopes.

Many of the stars must be much superior in brightness to our sun. It has been computed that Sirius, the brightest of the stars, emits 14 times as much light as the sun.

It is probable that the stars are at as great a distance from each other as the nearest star is from the earth.

OF THE APPARENT MOTION OF THE STARS.

The motion of the earth upon its own axis, from west to east, causes the apparent motion of the stars in a contrary direction, from east to west: they all move round in circles parallel to the equinoctial.

Hence, when the equinoctial is perpendicular to the horizon, they rise and set perpendicularly; when the equinoctial cuts the horizon obliquely, they all rise and set obliquely; when it coincides with the horizon, the stars neither rise nor set, but move round in circles parallel to the horizon.

At the equator the pole star is always upon the horizon, and all the other stars rise and set perpendicularly: each star being 12 hrs. above and as many below the horizon, as may be seen by elevating the globe for a right sphere.

In the N. Temperate Zone the stars all rise and set obliquely; and those stars whose distance from the pole is not greater than the latitude of the place, turn round the pole without setting. This will be seen by elevating the globe for the latitude of London. But it will be better observed by having recourse to the heavens themselves, and watching the motion of the stars for a few hours in a winter's evening.

Those stars that have, at any time, the same right ascension with the sun, come to the meridian with it; and the other stars come to the meridian before or after the sun, according as they are W. or E. of it. The sun appears to advance eastward among the stars, at the rate of nearly 1° or 4 m. of time per day: this causes the stars to come to the meridian, on any day, 4 minutes sooner than on the day preceding.

Those stars that are on the meridian at midnight will, the next night, be on it 4 m. before 12; in 2 nights 8 m., and so on. From this cause, the heavens in the course of 6 months present an entirely new assemblage of stars (with the exception of those that never go below the horizon) to the eye. A revolution of one year brings the sun exactly into the same situation, with respect to the stars, as it was on the same day of a former year,—on the same day of any year the same stars will always come to the meridian at the same time.

A siderial day, by which astronomers generally reckon, is 4 m. shorter than the solar one; and a siderial year (that is, the time in which the earth completes a revolution in its orbit, as indicated by its return to the same point in the heavens) is 365 d. 6 h. 9 m. 9.6 s. long, according to solar time, but is 366 d. 6 h. 9 m. 9.6 s. reckoned in siderial time. Civil time is regulated by the equinoctial year, which is the interval between two returns of the sun to the same equinox. Its duration is 365 d. 5 h. 48 m. 49·7 s.

OF NEW, TEMPORARY, VARIABLE, AND DOUBLE STARS.

Several stars which are marked in the early catalogues, and some which have been observed by modern astronomers, have disappeared from the sky. On the other hand, there are some stars now in the heavens which have only recently become visible; these are termed *new* stars.

A kindred phenomenon is that of stars becoming suddenly visible, shining for a brief period with considerable splendour, and then disappearing altogether. These are *temporary* stars.

The earliest star of this kind on record is that which suddenly appeared in the year 125 B.C. It was observed by Hipparchus, who was in consequence induced to draw up a catalogue of the stars, the earliest on record. Another blazed forth in A.D. 389, remained three weeks as bright as Venus, and then disappeared altogether. There are records of similar appearances in the years 945, 1264, and 1572. The star of 1572 was observed by Tycho Brahe. His attention was drawn to it by observing one evening (Nov. 11) on his return from his observatory to his dwelling-house, a group of country people gazing at a star which he was sure did not exist half an hour before. It was then as brilliant as Sirius and continued to increase, till it surpassed Jupiter when brightest, and was even visible at mid-day. It began to diminish in Dec. of the same year; and in March, 1574, it had entirely disappeared. The stars of 945, 1264, and 1572 appeared in the same part of the heavens, between Cepheus and Cassiopeia. This circumstance, combined with the fact of their having appeared at nearly equal intervals, has suggested the idea that the appearances are owing to the revolution of the same star in an extremely eccentric orbit. This conjecture will be confirmed or overthrown in about 30 or 40 years, when, if correct, the star will re-appear.

There is a class of stars denominated *variable*, whose light undergoes a periodical increase and diminution.

One of the most remarkable of these is Algol in Medusa's head. It is usually visible as a star of the 2nd mag., and as such continues visible for 2 d. 14 hrs. when it suddenly begins to diminish in splendour, and in about 3½ hrs. is reduced to the 4th mag. Its feeblest lustre lasts little more than 15 m., when it begins to increase, and in 3½ hrs. more is restored to its usual brightness. Its full period is 2 d. 20 hrs. 48 m. Another of these stars is ο Ceti, called also Mira, or the wonderful star. It goes through its phases in 331 d. 10 hrs. When brightest it is of the 2nd mag., and remains so for about a fortnight. It then decreases during 3 months, when it passes out of sight, continues invisible for 5 months, and then reappears. There are altogether about 20 stars ascertained to be variable, and upwards of 50 suspected to belong to the class.

Many stars are multiple, that is, they appear to be single when seen by the naked eye, but are found to consist of two or more when viewed through a telescope of sufficient power.

The number of these *double stars*, and the smallness of the interval between the stars so conjoined, forbid the idea of an accidental contiguity. This is entirely put out of the question by the discovery of the fact that many of these double stars revolve round a common centre. Fifty or sixty instances have been noticed of the two stars revolving about each other in regular orbits, and constituting what are termed *binary stars*, to distinguish them from double stars generally so called. Some of the most remarkable of these are Castor, whose constituents complete a revolution in 252 yrs.; η Coronæ in 43 yrs.; ξ Ursæ in 58 yrs.; 61 Cygni in 452 yrs.; γ Virginis in 629 yrs.

Besides binary stars, systems consisting of three, four, and even five individuals, have been found to exist.

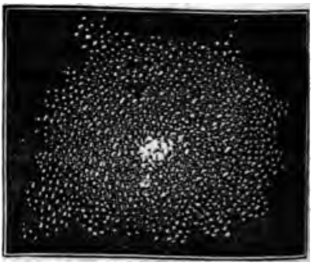
Many of the double stars exhibit the curious and beautiful phenomena of contrasted colours. In such instances the larger star is usually of a ruddy or orange hue while the smaller one appears blue or green. Persons possessed of ordinary telescopes will get an illustration of this by observing the star Albireo in the beak of the Swan.

The whole number of stars whose multiple character has been ascertained, cannot be less than 6,000.

OF NEBULÆ AND CLUSTERS OF STARS.

The most astonishing as well as most mysterious objects in the heavens are *nebulæ*, which are misty patches of light, and are scattered in considerable numbers through space. When viewed through powerful telescopes some of them are found to consist of clusters of stars; these are termed resolvable nebulæ; in other cases the diffused luminosity continues unbroken; these nebulæ are said not to be resolvable.

On a clear winter's night a faint light is observed to envelope the six or seven stars which form the Pleiades; a common telescope will show that it is occasioned by a cluster of stars too minute to be individually recognized by the naked eye. A cluster in the sword handle of Perseus affords a similar and very beautiful exhibition; and the luminous spot in Cancer, called Præsepe or the bee-hive, may with equal facility be resolved. In the constellation Hercules, midway between the stars η and ζ is a nebula which in favourable circumstances may be seen by the naked eye. Viewed through an ordinary telescope it appears exactly like a small round comet without a tail, but when very high powers are applied to it, an appearance like that figured in the cut is presented. "It would be a vain task (says Sir John Herschel) to count the stars in one of these *globular clusters.* They are not to be reckoned by hundreds. On a rough calculation it would appear that many of them must contain at least ten or twenty thousand stars compacted and wedged together in an area not more than a tenth part of that covered by the moon." And yet, in all probability, the individuals of such a group are suns like our own, and their mutual distances equal to those which separate our sun from the nearest fixed star! The works of God baffle our comprehension—how mysteriously great and glorious is the Creator! "Canst thou by searching find out God? canst thou find out the Almighty unto perfection?"



Many, however, of the nebulæ (and such only are properly so called) cannot be resolved. A remarkable nebula of this kind is in the constellation Andromeda, near the star ν. It is visible, under favourable circumstances, to the naked eye, and when seen through a telescope has the appearance of a candle shining through a horn (see cut.) It has in it a few small stars; but they are obviously casual, and the nebulæ itself offers not the slightest appearance to give ground for a suspicion of its consisting of stars." A telescope of very moderate powers directed to the middle star of the three forming the sword of Orion will reveal a very beautiful nebula. Between the stars β and γ Lyræ (see fig. of Lyra) is a nebula that has the appearance of a ring, that is easily seen.

The number of nebulæ already catalogued is between two and three thousand.

It is considered by many that our sun partakes of the nebulous character. The peculiar appearance called the zodiacal light has led to this conjecture. It is easily seen after almost any clear sunset in tropical climates, but in this country it can only be distinguished in the evening about the months of April and May, or at the opposite season before sunrise. It consists of a long train of faint light of a conical form surrounding the sun and following generally the course of the ecliptic. It extends beyond the orbit of Venus.

PROBLEM I.

To find the Right Ascension and Declination of any Star.

Bring the star to the brass meridian; the degree of the meridian over it is the declination, and the degree of the equinoctial under the meridian the right ascension.

Declination on the celestial globe is the same thing as latitude on the terrestrial, and right ascension the same thing as longitude.

The right ascension may otherwise be found by elevating the globe for a right sphere, (viz. bringing the poles to coincide with the horizon,) and bringing the star to the eastern horizon; the point of the equinoctial that comes to the horizon at the same time will be the right ascension. It may be expressed either in degrees or hours.

The use of the declination is principally to find the latitude of any place by the altitude of the stars.

EXAMPLES.

1. What are the right ascension and declination of Sirius? *Ans.* Rt. as. 99° 0′, or 6 hrs. 36 m. Dec. 16° 27′ S.

2. Required the rt. as. and dec. of the pole star. *Ans.* Rt. as. 13° 0′, or 0 h. 52 m. Dec. 88° 14′ N.

Required the right ascension and declination of—

3. Andromeda's Girdle, Mirach, β. 4. Ram's Following Horn, α. 5. Whale's Jaw, Menkar, α. 6. Medusa's Head, Algol, β. 7. Perseus' Side, Algenib, α. 8. Brightest of the Seven Stars. 9. Bull's Eye, Aldebaran, α. 10. Auriga's Shoulder, Capella, α. 11. Orion's Foot, Rigel, β. 12. Bull's N. Horn, β. 13. Orion's Left Shoulder, Bellatrix, γ. 14. Orion's Girdle, ε. 15. Orion's Right Shoulder, Betelguese, α. 16. First Twin, Castor, α. 17. Little Dog, Procyon, α. 18. Second Twin, Pollux, β. 19. Boötes, Arcturus, α. 20. Lyra, α.

PROBLEM II.

Having the Right Ascension and Declination of a Star, to find it on the Globe.

Bring the right ascension, marked on the equinoctial, to the brass meridian; then, under the given declination marked on the meridian, will be the star required.

EXAMPLES.—Required the stars whose right ascension and declination are as follow:

	RIGHT ASCENSION.		DECLINATION.
	In degrees.	*In time.*	
1.	139° 15′	9h. 17m.	7° 48′ S.
		Answ. Alphard, Hydra's Heart.	
2.	149 15	9 57	12 56 N.
		Answ. Regulus, Lion's Heart.	

RIGHT ASCENSION.				DECLINATION.		
In degrees.		*In time.*				
162	15	10	49	57	27	N.
162	45	10	51	62	50	N.
174	30	11	38	15	41	N.
191	15	12	45	57	3	N.
198	30	13	14	10	7	S.
209	30	13	58	65	20	N.
211	30	14	6	20	13	N.
219	45	14	39	15	12	S.
226	30	15	6	8	38	S.
231	30	15	26	27	24	N.
244	15	16	17	25	58	S.
256	15	17	5	14	38	N.
261	15	17	25	12	43	N.
268	0	17	52	51	31	N.
277	30	18	30	38	36	N.
295	15	19	41	8	21	N.
341	30	22	46	30	40	S.
343	30	22	54	14	8	N.

PROBLEM III.

o find the Latitude and Longitude of a given Star.

Bring the pole of the ecliptic, which is in the same sphere with the given star, to the brass meridian, and ver it the quadrant of altitude.

Holding the globe steadily, move the quadrant till ne over the given star; then the degree of the qua- cut by the star is its latitude, and the degree on the tic cut by the quadrant is its longitude.

t part of the heavens north of the ecliptic is called the *northern* here, and that south of the ecliptic the *southern* hemisphere; so star may be north of the equinoctial, and yet have S. latitude,— h of the equinoctial, and have N. latitude.

longitude of celestial bodies is not reckoned in *degrees* and *mi-*

Required the lat. and long. of the following s

1. Taurus, β. *Answ.* 5° 22′ N. L. ♊
2. Pollux. *Answ.* 6° 40′ N. L. ♋
3. Regulus.
4. Scorpio, β.
5. Markab.
6. Atair.
7. Arided.
8. Schedir.
9. Draco, α.
10. Capella.
11. Fomalhaut.
12. Procyon.
13. Centaur, α.
14. Enar Achernar.
15. Arcturus.
16. Du
17. Alg
18. Ald
19. Spic
20. Ant
21. Rig
22. Car

PROBLEM IV.

The day of the month being given, to find at wha Star comes to the Meridian.

By the Globe.—1. Bring the sun's place t ridian, and set the index to 12 o'clock.

2. Turn the globe round till the given st the meridian, and the index will show the hour

If the star be to the E. of the sun, it will come to the m the sun, and hence the hour will be *p.m.*; but if the star b of the sun, the hour will be a.m.

If the right ascension of the sun be greater than that of the star, add to it 24 before you subtract; and the remainder, if less than 12, is he time of the star's coming to the meridian in the *afternoon;* if the remainder be greater than 12, take 12 away, and the last remainder is he time of the star's coming to the meridian in the *morning.*

EXAMPLES.—At what hour do the following stars come to the meridian on Feb. 9th?

1. Lyra? *Ans.* 9 h. 1 m. *a.m.*
2. Aldebaran? *Ans.* 6 55 *p.m.*
3. Arcturus?
4. Capella?
5. Sirius?
6. Regulus?
7. Castor?
8. Fomalhaut?
9. Markab?
10. Atair?

The first example performed without the globe.

The sun's right ascension, on Feb. 9th, is 21 hrs. 29 min.; the right ascension of Lyra is 18 hrs. 30 min.; to the last add 24, and from the sum 42 hrs. 30 min., subtract 21 hrs. 29 min.: the remainder s 21 hrs. 1 min. From this remainder take away 12, and there are eft 9 hrs. 1 min.; which is the time of the star's coming to the meridian in the morning.

Required the time at which the following stars come to the meridian on the respective days.

11. Regulus, Oct. 24.
12. Draco, α. Sept. 20.
13. Bellatrix, Jan. 7.
14. Cassiopeia, β, Nov. 8.
15. Ras Algethi, Aug. 22.
16. Menkar, May 5.

At what hour does Alphard (Hydra's Heart) on—

17. January 29?
18. May 15?
19. August 12?
20. September 23?
21. November 5?
22. December 21?

At what hour do the following stars.

23. Mirach, April 6.
24. Almaach, June 21.
25. Algol, July 12.
26. Seven stars. Aug. 29.
27. Procyon, Oct. 14.
28. Great Bear, α, Dec. 26.

dian, and set the index to the given hour.

2. Turn the globe till the index point to 1
the day of the month, corresponding to the de
ecliptic under the meridian, will be the day re

Without the Globe.—1. If the star come
ridian in the morning, add the time that it wa
to the right ascension of the star, and the sum
right ascension of the sun on the required day

2. If the star come to the meridian in the ev
tract the time from noon from the star's right
and the remainder will be the sun's right asce

3. The day of the month, answering to
ascension, may be found from Table II.

If, in adding, the sum is more than 24h., or 360°, sub
24h., or 360°, and the remainder will be the sun's right as

If, when you subtract, the r. as. of the star is less than
noon, add to it 24h., or 360°, before subtracting.

Examples.—1. On what day does Algenib,
come to the meridian at midnight?

Here 3h. 10m., the right ascension of Algenib, added

On what days do the following stars come to the meri-an at nine o'clock in the evening?

7. Ras Alhague? 9. Leo, β?
8. Rastaben? 10. Pegasus, β?

Required the days on which the following stars come the meridian, at five o'clock in the morning.

11. Sirius. 14. Great Bear, δ.
12. Aries, α. 15. Serpent, α.
13. Taurus, β. 16. Andromeda, α.

On what days do the following stars come to the meri-an at ten o'clock in the evening?

17. Orion, ε. 18. Acubens. 19. Alderamin.

On what days does Acturus come to the meridian, at—

20. Noon? 22. 9 *p.m.*? 24. 3 *a.m.*?
21. 3 *p.m.*? 23. Midnight? 25. 6 *a.m.*?

PROBLEM VI.

he Latitude, Hour of the Night, and Day of the Month, eing given, to find the Altitude and Azimuth of any Star.

Elevate the globe for the given latitude, bring the n's place to the meridian, and set the index to 12; and rn the globe till the index point to the given hour.

Fix the quadrant of altitude on the zenith, and bring over the star; then the degree upon the quadrant cut y the star will be its altitude, and the distance between e foot of the quadrant and the north or south point of e horizon will be the azimuth.

Examples.—1. Required the altitude and azimuth of or Leonis, at London, on May 11th, at 11 o'clock *p.m.*

Ans. Alt. 26° 50′. Az. S. 76° 30′ W.

2. Required the altitude and azimuth of Capella, at ome, on December 2nd, at five in the morning.

Ans. Alt. 42°. Az. N. 60° W.

What are the altitude and azimuth of the following ars, at Newcastle, October 6th, at the following hours?

3. Arided, midnight.
4. Capella, 8 *p.m.*
5. Castor, 10 *p.m.*
6. Algenib (α, Perseus), 8 *p.m.*
7. Menkar, 11 *p.m.*
8. Atair, 9 *p.m.*
9. Vega, 9 *p.m.*
10. Arcturus, 7 *p.m.*

Required the altitude and azimuth of the following stars, at London, December 21st, at 4 in the morning.

11. Spica Virginis.
12. Sirius.
13. Deneb (Leo, β).
14. Cor Hydræ.
15. Procyon.
16. Pleiades (Taurus, η).
17. Arided (Cygnus, α).

Give the altitude and azimuth of the following stars, at C. Good Hope June 21st, at midnight.

18. Spica Virginis.
19. Antares (Scorpio, α).
20. Arcturus.
21. Ras Alhague.
22. Fomalhaut (S. Fish, α).
23. Achernar (Eridanus, α).

What are the altitude and azimuth of the following stars, at Jerusalem, August 9th, at 4 o'clock, *a.m.*?

24. Menkar (Cetus, α).
25. Algol.
26. Dubhe (Ursa Major, α).
27. Phœnix, α.
28. Fomalhaut (S. Fish, α).

Required the altitude and azimuth of the following stars at Quito, on March 22nd, at 10 *p.m.*

29. Cor Hydræ.
30. Canopus (Argo, α).
31. Sirius.
32. Centaurus, α.
33. Cor Caroli.

PROBLEM VII.

The Azimuth of any Star and Day of the Month being given, to find the Hour of the Night and the Altitude of the Star, in a given Latitude.

1. Rectify the globe as in the last problem, fix the quadrant of altitude upon the zenith, and bring it to the given azimuth.

2. Turn the globe round till the star come to the quad-

then the index will show the hour, and the altitude 3 star will be found upon the quadrant.

N. B. Some of the examples admit of two answers.

EXAMPLES.

The azimuth of Regulus, the Lion's Heart, at Lon- May 11, was S. 76° W.; required the altitude and of the night. *Ans.* Hour, 11 *p.m.* Alt. 27°.

The azimuth of Capella, at Rome, on Dec. 2d, was)° W.; required the altitude and hour of the night. Hour, 5 *a.m.* Alt. 42°.

.ving the azimuth of the following stars, required altitude, and the hour for London, on Sept. 1st.

ꞁas Alhague, S. 47° W.	5. Delphinus, α, S. 20 E.
)ubhe, N. 23 W.	6. Cygnus, α, S. 55 E.

ıving the azimuth of the following stars for New- :, Oct. 6th, required the hour and the altitude.

ieven stars, S. 88½° E.	11. Auriga, β, N. 52 E.
ırcturus, N. 81 W.	12. Betelguese S. 80 E.
ꞁries, α, S. 65 E.	13. Cancer, α. S. 70 E.
;apella, N. 40 E.	14. Procyon, S. 29. E.

PROBLEM VIII.

ꞁltitude of a Star, the Day, and the Latitude being iven, to find the Azimuth and Time of the Night.

Rectify the globe as in the former problems.

Having screwed the quadrant upon the zenith, turn lobe and move the quadrant till the star cut the 'ant at the given altitude; the index will show the and the quadrant the azimuth on the horizon.

stars having the same altitude twice a day, it is necessary to ;hether the given star is E. or W. of the meridian; or whether ır required is in the evening or morning.

ıMPLES.—1. The altitude of Rigel, in Orion, was ved at Boston (America) to be 15° in the evening of December 8th; what were the hour and azimuth, *Ans.*, 8 hrs. 1 min.; azimuth, S.E. by E. 7° E.

2. At Jerusalem, on the morning of August 9, the altitude of Alderamin (Cepheus, α,) was 41°; required the hour and the azimuth. *Ans.* Az. N. 34° W.; hour 4.

Having the altitudes of the following stars at London, on the days given, required the time and azimuth.

3.	Sept. 1, Even.	Ursa Major, η,	38°
4.	Dec. 21, Morn.	Deneb, Leo, β,	50
5.	May 11, Even.	Regulus,	27
6.	Sept. 1, Even.	Scheat Alp. β, Pegasus,	47
7.	May 11, Even.	Castor,	18
8.	Dec. 21, Morn.	Sirius,	8

Having the altitudes of the following stars at Grand Cairo, required the hour and azimuth.

9.	June 4, Even.	Alphard,	14½°
10.	————	Spica,	43
11.	Aug. 12, Morn.	Menkar,	57
11.	————	Sirius,	14½

PROBLEM IX.

Having the Azimuth of a Star, the Latitude, and Hour, to find the Star's Altitude and Day of the Month.

1. Elevate the globe for the latitude,—fix the quadrant on the zenith, and bring it to the given azimuth.

2. Bring the star to the edge of the quadrant, and set the index to the given hour; the altitude of the star will then be found upon the quadrant.

3. Turn the globe till the index point to noon; and the day of the month answering to the degree of the ecliptic cut by the brass meridian, is the day required.

EXAMPLES.

1. At London, 11 o'clock *p.m.*, the azimuth of Spica Virginis was observed to be S. 17° W.; required its altitude and the day of the month. *Ans.* May 11th; alt. 27°.

2. At London, 9 *p.m.*, the azimuth of α, N. Crown, as S. 89° W.; what were the alt. and day of the month? *ns.* Sept. 1st.; alt. 38°.

3. At Newcastle, 10 *p.m.*, the azimuth of Almaach (Anromeda, γ) was S. 84° E.; required the alt. and day.

4. At Jerusalem, 4 *a.m.*, the azimuth of Markab was . 71° W.; what were the day and altitude?

5. At Jerusalem, at 4 *a.m.*, the azimuth of Alderamin as N. 34° W.; required the day and altitude.

6. At the Cape of Good Hope, at midnight, the aziuth of the star Fomalhaut was S. 73° E.; required the ay of the month and the altitude of the star.

7. At Rome, 5 *a.m.*, the azimuth of Capella was N. 60° V.; required the day and the altitude of the star.

PROBLEM X.

o find the Hour of the Night, by observing when any two Stars have the same Azimuth.

1. Rectify the globe as in the preceding problems.

2. Move the globe and the quadrant, till the quadrant ome over both stars; the index will shew the hour.

It may be found when two stars have the same azimuth, by holding p a small line, with a plummet, between the eye and the stars; or, by bserving when any two stars are in a line with the end of a house or all, that is known to be perpendicular.

EXAMPLES.—1. May 11th, at London, Vega and Atair ere observed to have the same azimuth; what was the our? *Answ.* 2 hrs. 15 min. *a.m.*

2. March 29th, Atair and Vega had the same azimuth t Stockholm; required the hour. *Answ.* 4 o'clock *a.m.*

Required the hour at London when the following stars ave the same azimuth on the annexed days.

3. January 3,	Algol and Aldebaran.
4. February 6,	Cor Caroli and Arcturus.
5. May 12,	α, Cygnus, and α, Pegasus.
6. November 15,	Castor and Cor Hydræ.

7. Procyon and Sirius were observed to have the same azimuth at Rome, December 2nd; what was the hour?

PROBLEM XI.

To find the rising, setting, and culminating of any Star,—its continuance above the Horizon,—its oblique Ascension and Descension,—and its eastern and western Amplitude for any given Day and Place.

Rectify the globe as in the preceding problems.

2. Bring the given star to the eastern horizon, and the index will shew the hour of rising; the degree of the equinoctial that rises with the star is its oblique ascension; and the distance of the star from the east point of the horizon is its eastern or rising amplitude.

3. When the star is brought to the meridian, the index will shew the time of culminating.

4. Bring the star to the western horizon, and its setting, oblique descension, and western amplitude, will be found in the same manner as its rising, eastern amplitude, and oblique ascension.

5. The number of hours from rising to setting will be the time of its continuance above the horizon.

EXAMPLE.—Required the time when the following stars rise, come to the meridian, and set; how long they continue above the horizon; likewise their oblique ascension and descension, and their eastern and western amplitude, at the respective places and days.

1. Sirius at London, on March 14th.

Answ. Rises at 2h. 24m. *p.m.*; Culminates, 6h. 57m. *p.m.*; Sets, 11h. 30m. *p.m.*; Above the horizon, 9h. 6m.; Oblique ascension, 120° 47′; Oblique descension, 77° 17′; Amplitude, 27° S.

2. Fomalhaut, at the Cape of Good Hope, on Dec. 10th.

Answ. Rises, 10h. *a.m.*; Culminates, 5h. 30m. *p.m.*; Sets, 1h. *a.m.* Above the horizon, 15h.; Oblique ascension, 317°; Oblique descension, 5°; Amplitude, 38° S.

3. Achernar in Eridanus, at Otaheite, on June 4th.

4. Arcturus, at Newcastle, on March 11th.

igel, at Jerusalem, on September 23rd.

Ienkar, *α*, Cetus, at Rome, on October 12th.

t what time does Atair rise, culminate, and set at a on June 9th?

PROBLEM XII.

resent the Face of the Heavens for any given Day and Hour, in any given Latitude.

g the sun's place to the meridian, put the index and turn the globe to the given hour; the stars in avens will appear in the same situations as they are he globe, but in an inverted order.

EXAMPLES.

equired the situation of the stars for the latitude castle, on October 6th, at 8 *p.m.*

answer to this example constitutes—

A SURVEY OF THE HEAVENS.

AURIGA.

irst star which strikes the eye of the observer, in the north-east part of the heavens, is Capella, in the constellation *Auriga*, or the Waggoner: it is a beautiful star of the 1st magnitude, of the altitude of 23°, or nearly the fourth part of the distance from the horizon to the zenith. There are in this constellation 2 stars of the 2nd magnitude, which form with Capella a triangle;—the star which forms the short side of the triangle is in the right shoulder of Auriga, and is marked *β*; it lies at the distance of about 8° from Capella, further to the north; its altitude is 18°:—the star forming the longer side of the triangle is in the right foot; it is also usually represented as forming the tips of the Bull's northern horn; its distance from Capella is more than 25°; its alti- *more than 5°, and* azimuth N.E. The general grouping of the stars of this constellation forms a six-sided figure, as represented in the annexed figure.

The star Capella is easily distinguished by the acute angled triangle formed by 3 stars of the 4th magnitude, a little to the south of Capella, that bear the name of the *Kids*.

GEMINI.

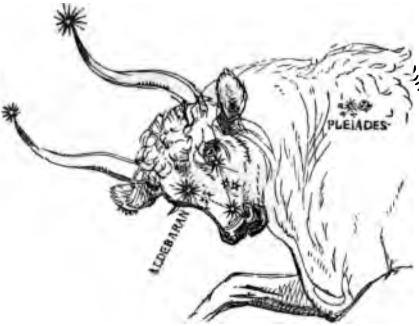
If a line be drawn through the two stars that form the upper side of the triangle, and continued to the horizon, it will point out Castor, *α*, in Gemini, just rising; azimuth, E.N.E.: it is between the 1st and 2nd magnitude. The other stars in this constellation have not yet risen; but when they are above the horizon they form a tolerably correct parallelogram.

PERSEUS.

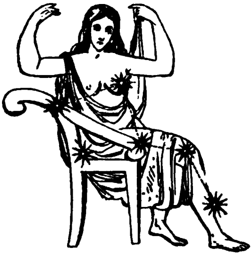
A line drawn between Castor and Capella, and continued higher in the heavens, will point out *Perseus*. It may also be easily found by directing the eye to the seven stars, and noticing the curved line which the principal stars in the constellation make from that point. Algenib, in the breast of Perseus, is a star of the 2nd magnitude. In the sword handle of Perseus is a beautiful cluster of stars, which a telescope of moderate power will display.

A little to the south of Perseus is the head of *Medusa*, which Perseus is holding in his hand. The brightest star in it is Algol, which is a variable star; its altitude is 33°; azimuth, E.N.E.; it is only 10° distant from Algenib.

Directly below the head of Medusa, about 14° above the horizon, are the *Pleiades*, or Seven Stars: they are situated in the shoulder of *Taurus*, and are so easily known, that no description is necessary. Aldebaran, a star of the 1st magnitude, which forms the eye of Taurus, is just rising; azimuth, E.N.E. A vertical circle, drawn through Algol, will point to it. There are 2 stars of the 3rd magnitude, and several smaller, very near Aldebaran, which form with it a triangle, or the letter V. The whole cluster is called the *Hyades*.



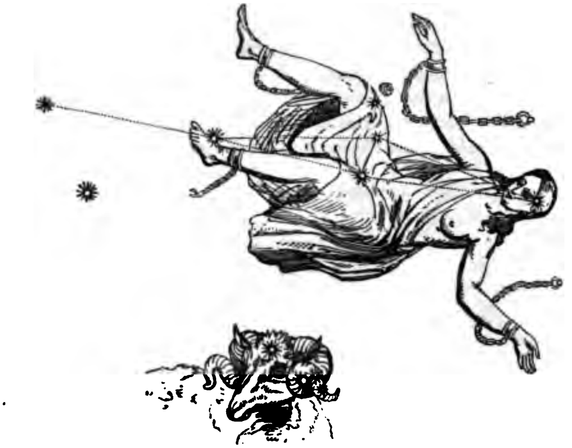
TAURUS.



CASSIOPEIA.

A line, drawn from Aldebaran through Algol, and continued to the zenith, will direct to *Cassiopeia*, or the *Lady in the chair*. This contains 5 stars of the 3rd magnitude, besides several of the 4th: it is in form something like the letter W, or, as some think, an inverted chair. It is situated above Perseus, within 30° of the zenith. The altitude of the brightest star, α, called Schedir, is 60°; azimuth, E.N.E.

Below Cassiopeia, and west of Perseus, is *Andromeda*, which contains 3 stars of the 2nd magnitude. A line from Algenib, parallel to the horizon, toward the south, will pass very near these 3 stars; and as they are all of the same magnitude, and placed nearly at the same distance of 15° from each other, they may easily be known. The name of the star nearest Perseus, and which is in the foot of Andromeda, marked, γ, is Almaach: its altitude is 49°, azimuth, E.N.E. The



name of β, in the girdle, is Mirach: its altitude 44°; azimuth, E. The altitude of α, in the head of Andromeda, is 46°; azimuth, E. S. E. The remarkable nebula, of which a figure is given, (p. 271,) is shown in the annexed engraving near the star marked ν.

About 18° below Mirach are two stars in *Aries*, not more than 5° distant from each other, forming with Mirach an isosceles triangle: the eastern star, α, is of the 2nd magnitude; the other, β, of the 3rd, attended by a smaller star, marked γ, of the 4th magnitude. A line drawn from Mirach, perpendicular to the horizon, will pass between the two, and, besides, will point to a star of the 2nd magnitude, directly E., not 3° above the horizon.

This star is the first of *Cetus*, marked α, and is of the 2nd magnitude; it is named Menkar:—A line, drawn from Capella through the Pleiades, will also point to it. Cetus is a large constellation, and contains 8 stars of the 3rd magnitude; they all lie to the west of Menkar; β, a star in the tail, is more than 40° distant from it. The azimuth of β is S. E. by E.; altitude nearly the same as that of Menkar.

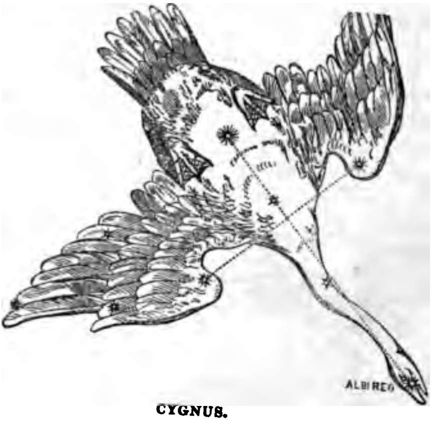
The constellation *Pisces* is situated next to Aries; a number of small stars under the left arm of Andromeda form the most northerly fish, and an ellipse of stars below the wing of Pegasus, (as shown in the figure of that constellation,) constitutes the other. This constellation ntains 1 star of the 3rd mag., marked α ;—its altitude is 10°: azi-ıth, E. by S.: it is distant from Menkar 15°. A line drawn from maach, through α in Aries, will point to it.

If we return again to α, in the head of Andromeda, we shall find ee other stars nearer the meridian, which, with it, form a very large ıare: these stars are in *Pegasus*, and are placed at the distance of

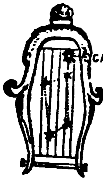
PEGASUS. PISCES. AQUARIUS.

° from each other; they are all of the 2nd mag. The 2 stars forming e western side of the square are called, the upper one Scheat, which marked β, and which is in the thigh of Pegasus; the under one, arkab, which is marked α, and which is in the wing: the lowest star the eastern side of the square is in the tip of the wing, and is marked The altitude of Scheat is 55°; azimuth, S.E. ½ E. Altitude of arkab, 43°; azimuth, S.E. by S. ½ E.

A line drawn through γ and β, (the diagonal in the square of Pegas,) and continued to the meridian, will point out *Cygnus*, a remarkle constellation, in the form of a large cross, in which there is a star f the 2nd magnitude, named Deneb, or Arided; it is marked α, and is most directly upon the meridian, at the altitude of 80°. Cygnus

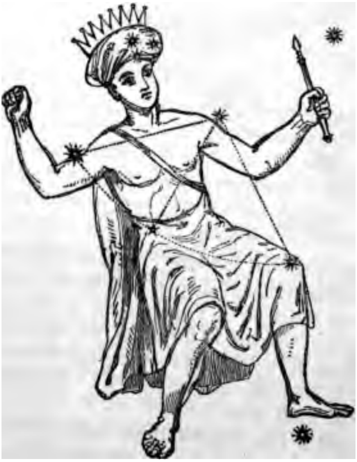


CYGNUS.



LYRA.

contains 6 stars of the 3rd magnitude, one of them Albi'reo, or β, i the beak, is a beautiful double star.



CEPHEUS.

The constellation *C* *pheus* contains no remarkable stars; it is situated between Cygnus an the north pole. It is easily found by observing that his left foot is close upon the pole star, and directing the eye in search of three stars of the 4th mag. which are in his head. Three others of the 3rd mag., one in his right shoulder, one in his side, and another in his left knee, form an arc of a circle, of which a star of the 4th magnitude in his left shoulder is the centre.

Below Pegasus, and nearer the meridian, is *Aquarius*, containing 4 stars of the 3rd magnitude. A line drawn from α in Andromeda,

h Markab, will point to α in Aquarius. Its altitude is 32°; azi-
S.S.E. The young student in search of Aquarius will do well
h for the four stars which form the water-pot, and which are ar-
as represented in the drawing.

ight star of the 1st magnitude, named Fomalhaut, in *Piscis*
lis, is then upon the horizon; azimuth, S.S.E.

hinus is a small constellation, situated about 30° below Cygnus,
e meridian: it contains 5 stars of the 3rd mag.; 4 of them are placed close together and form the figure of a rhombus, or lozenge. A line, drawn through the two under stars of the square, will point to it: its altitude is about 50°.

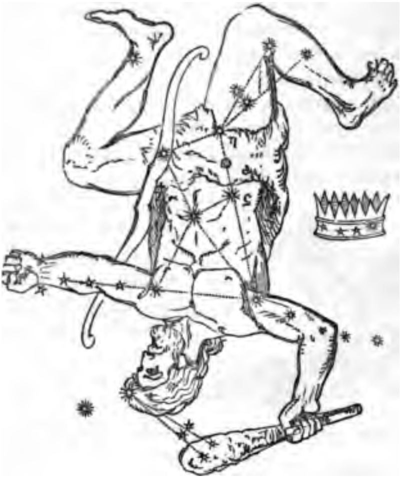
HINUS. AQUILA.

A little to the west of Delphinus, but not quite so high, is *Aquila*, containing one
right star, of the 1st magnitude, named Atair;—it may very
e known, from having a star on each side of it, of the 3rd mag-
forming a straight line: the length of the line is only about 5°:
e of Atair, 40°; azimuth, S.S.W.

siderably above Atair, and a little to the west of Cygnus, is *Lyra*,
ing a star of the 1st magnitude, one of the most brilliant in the
ent. It is called Lyra, or Vega, and is 35° to the north-west of
altitude, 60°; azimuth, W.S.W. Lyra, Atair, and Arided,
large triangle.

come now to notice three constellations, which occupy a con-
le space in the western side of the heavens:—these are *Hercules*,
iately below Lyra; *Serpentarius*, between Hercules and the
, extending a little more towards the south; and *Boötes*, reach-
m the horizon W.N.W. to the altitude of 45°.

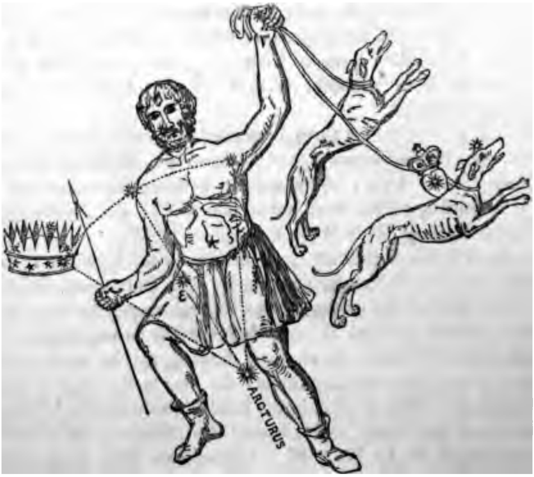
cules is rather a difficult constellation for the beginner to make
It is best to seek first for a star in his right foot, which, with three
in the head of the dragon, form a lozenge-shaped figure not easily
en. When this star is once detected the arrangement of the
tars, as indicated in the annexed drawing, may be made out. It
s 8 stars of the 3rd magnitude: the star in the head α, named
'gethi, is within 5° of α, in the head of Serpentarius. This last
r of the 2nd mag., and is named Ras Alhague; its altitude is
zimuth, S.W. by W. ½ W. A line drawn from Lyra, perpen-
to the horizon, will pass between these 2 stars. The other stars



in Hercules extend t
wards the zenith, an
those in Serpentarius t
wards the horizon. T
remarkable cluster
stars figured in p. 27
is situated midway b
tween ζ and η Hercul
as shown in the cut.
this magnificent clust
Professor Nichol r
marks, it is impossib
to give a fitting repr
sentation of it. Pe
haps no one ever saw
for the first time throug
a large telescope wit
out uttering a shout
wonder.

HERCULES.

The constellation *Boötes* may easily be known from the brilliancy
Arcturus, a star of the 1st magnitude, and supposed to be the neare



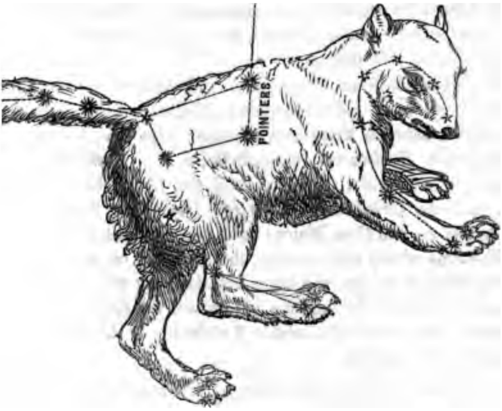
NORTHERN CROWN. **BOÖTES.** **COR. CAROL**

stem of any in the northern hemisphere; it is within 10° of
on; azimuth, W.N.W. Boötes also contains 7 stars of the
itude, mostly situated higher in the heavens than Arcturus.
immediately above Arcturus is called Mezen Mirach, and is
; it is a beautiful double star of different colours. The star
t shoulder, δ, named Seginus, forms, with Mirach and Arcturus
ight line.

en Serpentarius and Boötes is *Serpens*, containing 1 star of
nd 8 of the 3rd, magnitude: α in Serpens is nearly at the same
rom the horizon as Arcturus; azimuth, W.

Serpens, and a little to the east of Boötes, is the *Northern*
ontaining 1 star of the 2d magnitude, named Gemma, and
f the 3d, which have the appearance of a semicircle. A line,
m Lyra to Arcturus, will pass through this constellation.

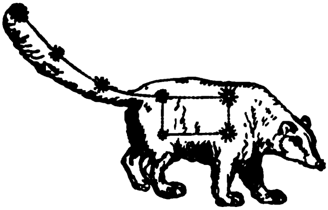
me now to *Ursa Major*, a constellation containing 1 star of
of the 2d, and 3 of the 3d magnitude. It may easily be dis-



URSA MAJOR.

d by these 7 stars, which, from their resemblance to a waggon,
d Charles's Wain. The 4 stars in the form of a long square,
our wheels of the waggon; the 3 stars in the tail of the Bear
three horses, which appear fixed to one of the wheels. The
wheels (α, named Dubhe, and β) are called the *pointers*, from
ays pointing nearly to the north pole: hence the pole star
nown. The other prominent stars in the Bear will be made
tolerable ease by a reference to the engraving. The altitude
e is 30°; azimuth, N. by W. ½ W.:—the distance between

the two pointers is 5°; the distance between the pole star and Dubhe, the upper pointer, is 30° *.



URSA MINOR.

Ursa Minor, besides the pole star, of the 2d magnitude, situated in the tail, contains 3 of the 3d, and 3 of the 4th magnitude. These form a figure having some resemblance to Charles's Wain, and may easily be traced.

Draco, containing 4 stars of the 2d, and 7 of the 3d magnitude, spreads itself in the heavens near Ursa Minor; the 4 stars in the head are in the form of a rhombus, or lozenge; the tail is between the pole star and Charles's Wain.

Besides these constellations, there are a number of others, which, as they contain no remarkable stars, have not been described:—an enumeration of these will suffice.

The *Lynx*, between Ursa Major and Auriga; *Camelopardalus*, between Ursa Major and Cassiopeia; *Musca*, and the *Greater* and *Less Triangles*, between Aries and Perseus; *Equuleus*, close to the head of Pegasus; *Sagittarius*, setting in the S. W.; *Antinoüs*, and *Sobieski's Shield*, below Aquila; the *Fox* and the *Goose*, between Aquila and Cygnus; the *Greyhounds*, *Charles's Heart*, and *Berenice's Hair*, between Boötes and Ursa Major; and *Leo Minor*, below Ursa Major.

The time of any star's passing the meridian on any day is 4 minutes earlier than it was on the preceding day; by making that allowance, the above view of the heavens will answer for September 6th, about 10 o'clock; September 21st, about 9 o'clock; or October 21st, about 7 o'clock in the evening.

2. Point out the situation of the stars, for the latitude of Newcastle, on January 1, at 8 o'clock in the evening.

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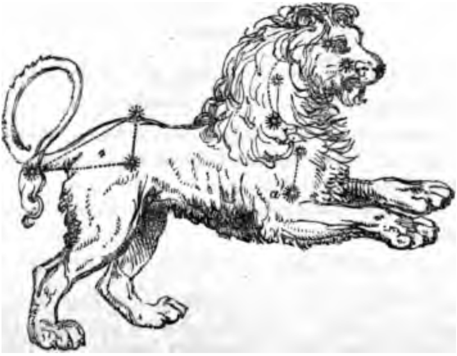
* The young zoologist may object to the length of the tail of this constellation, as well as of Ursa Minor. The following colloquy, from a writer of the 16th century, will amuse if it do not instruct him:—" *Scholar*. I marvell why, seeing she (Ursa Major) hath the forme of a beare, her taile should be so long. *Master*. Imagine that Jupiter, fearing to come too nigh unto her teeth, layde on her tayle, and thereby drewe her up into the heaven, so that shee of herselfe being very weightie, and the distance from the earth to the heavens very great, there was great likelihood that her taile must stretch."

The heavens are peculiarly splendid at this season. In addition to many of those constellations already described, Orion and the Great and Little Dog bespangle the sky. Orion is easily known by the 3 stars in his belt and the 3 in his sword. The brightest nebula in the heavens is situated on the middle star of the sword. The stars Betelguese, α, and Bellatrix, γ, point in a manner nearly direct to the bright star Prŏcȳon in the Little Dog, and the three in his belt point to Sirius in the Great Dog, the most brilliant of all the stars. The constellation of the Hare is beneath the feet of Orion.

ORION.

3. Required the situation of the stars at Newcastle, on arch 21st, at 9 in the evening.

The constellation *Leo Major* is seen to advantage at this time. The



LEO MAJOR.

head and fore quarters are indicated by a group of stars in the form of a reaping hook, the brightest of them is Regulus, α; a right angled triangle marks his hind quarters; the bright star in the tail is Denebola.

4. What are the principal constellations that will be above the horizon of Edinburgh, on May 1st, at 10 o'clock in the evening?

PROBLEM XIII.

To find what Stars never rise, or never set, to any place.

BY THE GLOBE.—1. Elevate for the latitude.

2. Hold a pencil at the north point of the horizon, and by turning the globe round, draw a circle; then all the stars between it and the elevated pole never set.

3. Hold a pencil at the south point of the horizon, and draw a circle as before; then all the stars between that place and the depressed pole never rise.

4. If the place has S. latitude, to find those stars that never set, hold the pencil at the south point of the horizon; and for those that never rise, at the N. point.

WITHOUT THE GLOBE.—1. Subtract the latitude of the place from 90°, and the remainder is the co-latitude.

2. If the declination of the star is greater than this, and of the same name, it will never set; if it be greater, and of a contrary name, it will never rise.

EXAMPLES.

1. What constellations never set at Newcastle, and what principal stars are always visible there?

Ans. Constellations.—Ursa Major, part of Auriga, Perseus, part of Andromeda, Cassiopeia, Cepheus, Cygnus, Lyra, Draco, part of Hercules, Ursa Minor, part of Boötes.

Stars.—Lyra, Arided, Alderamin, Almaach, Algol, Capella, Dubhe, Alioth, Benetnasch.

2. What constellations never rise to Newcastle?

Answ. Phœnix, Eridanus, Horologium, Cela Praxitelis, Equuleus Pictorius, Dorado, Argo Navis, Piscis Volans, Centaurus, Crux, Chameleon, Lupus, Norma, Indus, Triangulum Australe, Ara, Telescopium, Pavo, Grus.

3. Are there any stars that never set at Jamaica?

Answ. Ursa Minor, part of Cepheus, part of Camelopardalus.

4. Are there any stars that never rise at Otaheite?

Answ.—The same that never set at Jamaica.

5. How far N. must I go never to lose sight of Arcturus?

6. How far south of the equator must those people live who never see any part of the Great Bear?

7. In what latitude must I be never to see Lyra?

8. Where must I be never to see Sirius?

9. Whither must I go never to lose sight of Sirius?

QUESTIONS FOR EXAMINATION IN SECTION I.

What is the celestial globe? What is the solar system? What are the fixed stars? What is a constellation? What are the primary planets? What are satellites? What are comets?

What are the celestial poles? What is the equinoctial? What are parallels of declination? What are celestial meridians?

What are the declination and right ascension of a heavenly body? What is oblique ascension and ascensional difference? What are right and oblique descension, and descensional difference?

What are the latitude and longitude of a celestial body? What are parallels of celestial latitude, and circles of celestial longitude?

What is meant by the culminating of any celestial object? What is the azimuth of a heavenly body? What is amplitude?

What is the zodiac? How many degrees is it broad? Into how many signs, or constellations, is it divided?

What is meant by altitude and zenith distance? What is the orbit of a planet? When is a body in conjunction with the sun, and when is it in opposition? What is meant by occultation?

What is meant by the geocentric and heliocentric place of a planet?

How are stars classified? What is the lowest magnitude visible to the naked eye?

How many can be seen at any one time?

What is the milky way? What is the supposed distance of the nearest fixed star? What is the velocity of light? How long would a ray of light be in passing from the nearest star to the earth? At what rate does a ball fired from the mouth of a cannon move, and how long would it be in passing from the earth to the nearest star?

Are the stars all placed in the same concave hemisphere, at the same distance from the earth? What is meant by a temporary star? Who observed the earliest on record? When did the last remarkable one appear? When may it possibly reappear? What is remarkable about the star Algol? Name another variable star? What is a double star? Name one. What is the distinction between binary and double stars? What are nebulæ? Name one of the most remarkable of the resolvable nebulæ? What does the zodiacal light consist of? Where is it seen in the evening?

What is it that occasions the apparent motion of the stars from east to west? How do the stars rise and set at the equator? Which star appears always stationary?

How are the r. as. and dec. of any star found? From what point on the globe is the right ascension reckoned? How is a star found from having its r. as. and dec. given? How are the lat. and long. of a star found? The day of the month being given, how is it found at what hour any star comes to the meridian? How is it found on what day of the year any star passes the meridian at any given hour? How are the altitude and azimuth of any star found? From having the azimuth of any star and day of the month given, how are the altitude of the star and the hour of the night in a given latitude found? From having the alt. of a star, the day of the month, and lat. given, how are the az. and time of the night found? Having the az., lat., and hour given, how are the alt. of the star and day of the month found?

How is the hour of the night found, by observing when any two stars have the same azimuth? How are the rising, setting, and culminating of any star found? How are the oblique ascension and descension found? How are the eastern and western amplitude?

How may the globe be made to represent the face of the heavens, for any given day and hour, in a given latitude? How is it found what stars never rise, and what stars never set, to any place?

Point out upon the globe, all the stars of the first magnitude. Which constellations in the heavens appear the most brilliant?

QUESTIONS FOR EXERCISE IN SECTION I.

1. Required the right ascension and declination of Alphard, Benetnasch, Antares, Canopus, Acubens, and their latitude and long.
2. At what hours do Algol, Dubhe, Arcturus, Pollux, Bellatrix, Sirius, Capella, appear on the meridian of London, March 24th?
3. At what hours do they appear on September 25th?
4. When does Regulus come to the meridian on Jan. 1st, March 10th, June 14th, Sept. 25th, Oct. 25th, and Nov. 5th?
5. What is the right ascension of β, in Auriga?
6. What is the right ascension of β, in the Northern Scale?
7. On what days will the following stars be upon the meridian at

t:—Capella, Aldebaran, Bellatrix, Arcturus, Fomalhaut,
, Vega, and Atair?

what days do they come to the meridian at 4 *a.m.*?

January 1st, when it is 8½ *p.m.* at London, what are the alti-
azimuth of the following stars:—Algol; Pleiades; Menkar;
n; Sirius; Procyon; Taurus, β; Capella; Leo, γ; Cas-
ε; Cygnus, α; Vega, and Draco, α?

hat are the alt. and az. of Cygnus, α; Corvus, α; Regulus;
α; Procyon; Dubhe; Perseus, α; and Capella, at London,
at 10 *p.m.*?

n October 6th, the azimuth of Menkar, at Newcastle, was
.; required the hour and the altitude.

t London, on December 21st, the azimuth of Cor Hydræ was
.; required the hour and the altitude.

the Cape of Good Hope, on June 21st, the azimuth of Spica
vas N. 89° W.; required the hour and the altitude.

n August 9th, the altitude of Phœnix, α, at Jerusalem, was
ired the hour and the azimuth.

Quito, on March 22d, the altitude of Canopus (Argo, α) was
t was the hour?

hat was the hour at London, on September 1st, when the al-
Arided was 80°?

e azimuth of the brightest of the Pleiades, at Newcastle, was
E. when it was 10 in the evening; what was the day of the
d what was the altitude of the star?

Boston, U. S., the azimuth of Rigel was S. E. by E. 7° E.,
1 min. *p.m.*; required the day of the month.

hat time does Dubhe set at Newcastle on February 28th?

hen it was 5 in the morning at Rome, the azimuth of Capella
° W.; what was the day of the month?

ve the rising, setting, and culminating of Castor; Sirius;
orealis, α; Arcturus; and Procyon; at London, Jan. 31st.

w long is Sirius above the horizon at St. Petersburg?

what time does Achernar rise at York on September 2d?

hat is the time of rising, setting, and culminating of Algenib,
Vega, and Cor Hydræ, at St. Helena, Oct. 6th?

hat stars of the first and second magnitudes are above the hori-
ndon, on January 1st, at 9 o'clock in the evening?

quired the situation of the stars at York, on May 1st, when it
t?

hat constellations never set and what never rise at Rome?

at stars never rise and what never set at the north pole?

29. Are there any stars which never appear above the horizon at the equator?

30. Where must I be never to see Menkar?

31. Where must I be never to lose sight of Aldebaran?

SECTION II.

OF THE SUN.

The sun is the centre of the solar system, all the planets moving round it at different distances, and in different periods.

The ancients conceived that the earth was at rest, and that the sun, moon, planets, and stars all moved round it. Such is the equable motion of the earth that we have great difficulty in supposing that it is not only revolving on its axis, but is rolling rapidly in its path round the sun. But how much more probable is it that this little globe revolves once in the 24 hours upon its axis, than that the sun and fixed stars, all vastly greater than the earth, and at enormous and very different distances from it, complete a revolution round it in that period. The ancients noticed that the sun was continually shifting his place among the fixed stars, and that whilst he made only 365 revolutions round the earth, the stars had made 366. To account for these facts, they supposed that whilst the sun is carried round the earth by the general motion of the starry sphere, he has a sphere of his own which travels in the contrary direction, and makes one revolution round the earth in a year. They are as satisfactorily and much more simply accounted for upon the supposition that the earth has an annual course round the sun. In order to account for the apparently capricious motions of the planets, the ancients devised a complex system of independent spheres, the mechanism of which it was difficult to comprehend. Upon the Copernican theory, which supposes the sun to be the centre of the solar system, and the earth to have a double motion, all is plain and easy. Tycho Brahe, an able and very useful astronomer, unable to resist the truth of the theory of Copernicus, and yet unable to throw off entirely the prejudices of centuries, invented another system. He admitted that the sun was the centre round which all the planets, except the earth, revolved, but that the sun, with all his followers, revolved round the earth as the cetnre of the whole. This theory obtained few followers. The sun, though very nearly, is not exactly the centre of the solar system, the real centre being a point which is the common centre of gravity of the sun and the other bodies which compose the system.

Owing, however, to the immense quantity of matter contained in the sun, this point is almost identical with the sun's centre.

The figure of the sun is nearly globular, and its diameter is equal to 111 times that of the earth, being about 883,000 miles; hence its surface is 12,300 times, and its bulk, or solid content, 1,380,000 times that of the earth. The sun is composed of lighter materials than the earth, an equal bulk of the sun's substance possessing less than ¼ of the density of that of the earth; notwithstanding this, its gigantic dimensions give it a force of gravity 27 times greater than the earth. It is the attraction of the sun that retains the planets in their orbits, and to it they are indebted for light, heat, and motion. The sun is not absolutely at rest; it probably has a motion of its own through space; and it is found, by the spots on its surface, to turn round on its axis from west to east in about 25 days. The mean distance of the sun from the earth is 95,000,000 miles.

The sun agrees with the fixed stars in the property of emitting light continually; and it is not improbable that they have many other properties in common. The sun is therefore considered as a fixed star comparatively near us, and the stars as suns at immense distances.

From being the source of light and heat, the sun was long supposed to be a body of fire; but Sir W. Herschel supposed that the body of the sun is an opaque habitable planet, surrounded by a double atmosphere, the outer being luminous, diffusing light and heat through the whole system; the inner, a cloudy stratum protecting the body of the sun from the heat of the luminous one. The luminous atmosphere, being at times intercepted and broken, gives us a view of the dark one beneath, (the penumbra,) and of the body of the sun.

The spots on the sun are interesting telescopic objects, and large ones may be seen by instruments of moderate power, the eye of the observer being protected by coloured glasses. The spots consist of a perfectly dark central part surrounded with a kind of border, less completely dark, called a *penumbra*. Their general appearance is represented in the cut illustrating solar eclipses. They are irregular in shape and very various in size. Sometimes they exceed 45,000 m. in diameter.

When watched from day to day they appear to be subject to violent agitation; they enlarge and contract, break up into two or more, change their forms, disappear altogether, or new ones appear. They hardly ever last longer than six weeks. The neighbourhood of great spots, and the places where spots frequently afterwards break out, are generally observed to be covered with strongly marked curved or branching streaks more luminous than the rest, called *faculæ.* These are, perhaps, the ridges of immense waves in the luminous regions of the sun's atmosphere, indicative of violent agitation in their neighbourhood.

The annual revolution of the earth produces the apparent motion of the sun among the stars in the ecliptic, by which he describes his annual path. This produces a daily change in right ascension and declination. The sun's amplitude and azimuth vary, both with the day of the month and the latitude of the place.

The amplitude is always of the same name with the declination: the greatest amplitude north is, when the sun is in the north tropic; and south, when he is in the south tropic. Places that have the greatest latitude (not greater than 66½°) have the greatest variation of amplitude; places at the equator have the least variation.

PROBLEM XIV.

To find the Sun's Right Ascension and Declination.

Bring the sun's place to the brass meridian; the degree over it shows the declination, and the degree of the equinoctial under the meridian shows the right ascension.

Examples.—Required the sun's right ascension and declination for the following days.

	RIGHT ASCENSION.		DECLINATION.	
	In degrees.	*In time.*		
1. Jan. 1.	282° 22′	18h. 17 m.	21° 59′ S.	Ans.
2. Feb. 10.	324 22	21 37	14 10 S.	

3. March 22. 4. May 12. 5. June 22.
6. August 10. 7. September 22. 8. December 21.

PROBLEM XV.

To find the Sun's Oblique Ascension, Ascensional Difference, Eastern Amplitude, and Time of Rising, on any given day, at any given place.

1. Elevate the globe for the latitude, bring the sun's place to the meridian, and set the index to 12.

2. Bring the sun's place to the eastern side of the horizon, and the degree of the equinoctial now at the horizon is the sun's oblique ascension.

3. The right ascension being found by the last problem, the difference between it and the oblique ascension will be the ascensional difference.

4. The number of degrees on the horizon, intercepted between the east point and the sun's place, is the eastern or rising amplitude.

5. The hour shown by the index, when the sun is at the horizon, is the time of its rising.

From the ascensional difference, the time of the sun's rising may be found without the globe thus:—If the sun's declination and the latitude of the place are of the same name, the ascensional difference, reduced to time, and subtracted from six o'clock, will give the time of the sun's rising. If the declination and latitude are of different names, the ascensional difference must be added to six.

EXAMPLES.

1. Required the sun's oblique ascension, ascensional difference, eastern amplitude, and time of rising, at London, May 1st. *Ans.* Ob. as., 19°; As. diff., 19° 48′; E. amp., 25° N.; Rising, 4h. 40 m.

2. The same for Gibraltar, Nov. 25th. *Ans.* Ob. as., 257° 7′; As. diff., 15° 41′; E. amp., 26° 9′ S.; Rising, 7 h. 4 m.

3. For Halifax, (America,) Dec. 25th. *Ans.* Ob. as., 300°; As. diff., 25° 38′; E. amp., 34° S.; Rising, 7 h. 45 m.

4. Required the same for Hanover, June 4th.

5. Required the same for Newcastle, July 29th.

6. Required the same for St. Petersburg, June 21st.

PROBLEM XVI.

To find the Sun's Oblique Descension, Descensional Difference, Western Amplitude, and Time of Setting, on any given day, at any given place.

Proceed as in the last problem, only bring the sun's place to the western horizon.

The sun's setting may be found from the descensional difference.

If the declination and latitude be of the same name, the descensional difference, added to six o'clock, will give the time of the sun's setting; if they be of different names, the descensional difference, subtracted from six o'clock, will give the time of the sun's setting.

The sun's ascensional and descensional difference, as found by the globe, being equal to each other, either of them may be used in finding the rising and setting of the sun.

Examples.—Required the sun's oblique descension, descensional difference, western amplitude, and time of setting at the following times and places:—

1. C. Good Hope, July 19th.—*Ans.* Ob. des., 103° 44′. Des. diff., 15° 8′. W. amp., 25° 32′. Setting 5 h.

2. Quebec, May 15th. *Ans.* Ob. des., 74°. Des. diff., 21° 39′. W. amp., 28° N. Setting, 7 hrs. 23 m.

3. Alexandria, Jan. 21st. 4. Konigsberg, Aug. 12th.
5. Liverpool, May 14th. 6. Washington, Dec. 21st.
7. Archangel, June 21st. 8. Edinburgh, Jan. 1st.
9. Malta, June 9th.

PROBLEM XVII.

The latitude, hour of the day, and day of the month being given, to find the Sun's Altitude and Azimuth.

This problem is the same as Problem VI., page 277, only the quadrant of altitude must be brought over the sun's place, instead of being brought over the star.

Examples.—Required the sun's altitude and azimuth at the following places and times:—

	h. m.	*Altitude.*	*Azimuth.*
1. Lisbon, May 18,	7 30 *a.m.*	30°	N. 88° E.
2. Madrid, April 15,	10 0 *a.m.*	50	S. 47 E.

			h.	m.
3.	Jerusalem,	Feb. 22,	8	45 *a.m.*
4.	Bombay,	March 20,	9	30 *a.m.*
5.	Canton,	March 10,	8	0 *a.m.*
6.	Ditto,	———	4	0 *p.m.*
7.	Tongataboo,	Sept. 23,	4	0 *p.m.*
8.	Oonalashka,	June 21,	7	0 *p.m.*
9.	London,	May 1,	10	0 *a.m.*
10.	Rome,	March 10,	9	10 *a.m.*

PROBLEM XVIII.

The day of the month and the sun's azimuth being given, to find the Sun's Altitude and the Hour of the Day.

See Problem VII., page 278.

To all places in the torrid zone, when the sun's declination is greater than the latitude, and of the same name with it, the sun has the same azimuth twice in the forenoon and twice in the afternoon; and the examples in that case admit of two answers.

Examples.—1. At Gibraltar, on November 25th, the sun's azimuth was observed to be 50° from the south towards the east; what was the time? *Ans.* 8½ *a.m.*

2. At Madras, the sun's azimuth was observed to be N. 70° E. in the morning of June 15th; required the time. *Ans.* 24 min. past 7, or 52 min. past 8.

Having the sun's azimuth at the following places and days, required the hour and the sun's altitude.

3.	Tobolsk,	July 1,	S.	62°	W.
4.	Astracan,	Sept. 1,	S.	43	W
5.	Cairo,	Dec. 1,	S.	56	W.
6.	Paris,	Nov. 5,	S.	30	W.
7.	London,	May 1,	S.	44½	E.
8.	St. Petersburg,	July 27,	S.	70	E.
9.	Lima,	May 2,	N.	55	W.
10.	London,	June 21,	S.	67	E.

PROBLEM XIX.

The sun's alt., day of month, and lat. of the place being given, to find the Sun's Azimuth, and Hour of the Day.

See Problem VIII., page 279.

The sun having the same altitude twice in the day, it must be known whether the time be in the morning or in the evening.

Examples.—1. At Newcastle, May 15th, *p.m.*, the sun's alt. was 25°; required the hour and the sun's azimuth. *Ans.* 5 *p.m.*; azimuth, N. 88° W.

2. At Botany Bay, on April 23rd, the sun's altitude in the morning was observed to be 25°; required the hour and the azimuth, *Ans.* ¼ before 9; azimuth, N. 55° E.

Having the sun's altitude on the undermentioned days, required the hour and the sun's azimuth at—

			Altitude.	
3.	Madras,	June 21,	Morning	19°
4.	Cape Horn,	Dec. 22,	Evening	50
5.	St. Petersburg,	July 15,	Morning	26
6.	Batavia,	March 1,	Evening	46
7.	London,	August 21,	Morning	36
8.	Stockholm,	July 7,	Morning	12
9.	Constantinople,	Dec. 7,	Morning	12
10.	North Cape,	June 21,		4° 38′

PROBLEM XX.

The latitude, the sun's altitude and azimuth being given, to find the Day of the Month, and the Hour of the Day.

1. Elevate the globe for the latitude, fix the quadrant upon the zenith, and bring it to the given azimuth.

2. Turn the globe about, and that degree of the ecliptic which cuts the quadrant at the given altitude will be the sun's place,—from which find the day of the month.

3. Keeping the quadrant in the same position, turn the globe till the sun's place come to the meridian, and set

the index to 12: then bring the sun's place again to the quadrant, and the index will show the hour.

Unless it be known whether the sun be in the ascending or descending signs, the examples admit of a double answer.

EXAMPLES.

1. The sun was observed, in the summer season, to be 33° high, when its azimuth was S. 70° E. at St. Petersburg; required the day and hour. *Ans.* July 27, 8 h. 14 m. *a.m.*

2. The sun at Lima, being 45° high, when its azimuth was N. 50° W.; required the day and hour. *Ans.* May 2, or Aug. 10, at 2 h. 33 m. *p.m.*

3. At London, the altitude being 17° high, when the azimuth was S. 17° E.; name the day and the hour.

4. At the Pelew Islands, the sun being in the descending signs, its altitude was found to be 37°, when its azimuth was S. 54° W.; required the day and hour.

5. At Owhyhee, the sun's altitude was 27°, when its azimuth was S. 74° W.; required the day and the hour.

6. At London, the sun's altitude was 46° 31′, when its azimuth was S. 44½° E.; required the time.

QUESTIONS FOR EXAMINATION IN SECTION II.

What is the diameter of the sun? What is its bulk compared with the earth? What is the power of gravitation at its surface? What is it that retains the planets in their orbits? Is the sun absolutely at rest? What is its distance from the earth? What is Sir William Herschel's opinion with respect to the sun? Describe the general appearance of the spots on its surface? What is the penumbra supposed to be?

What produces the apparent motion of the sun among the stars?

How are the sun's right ascension and declination found for any day?

How are the sun's oblique ascension, ascensional difference, eastern amplitude, and time of rising found, on any given day?

How are the sun's oblique descension, descensional difference, western amplitude, and time of setting found? How may the time of the sun's rising be found from the ascensional difference?

From having the latitude, hour of the day, and day of the month given, how are the sun's altitude and azimuth found?

How are the sun's altitude and the hour of the day found in a given latitude, from having the day of the month and the azimuth?

Having the sun's altitude, day of the month, and latitude of the place given, how are the sun's azimuth and hour of the day found?

From having the latitude, the sun's altitude, and azimuth given, how are the day of the month and hour of the day found?

QUESTIONS FOR EXERCISE IN SECTION II.

1. Required the sun's right ascension and declination for the last day in each of the calendar months.

2. What are the sun's oblique ascension, ascensional difference, eastern amplitude, and time of rising, at the following times and places:—York, February 5th; Berlin, January 29th; Juan Fernandez, March 1st; Quito, June 21st; Samarcand, December 21st; Pegu, May 15th; Alexandria, August 10th; Bender, July 11th; Cape Horn, December 25th; Pelew Islands, November 5th?

3. Give the sun's oblique ascension, descen. difference, western amplitude, and time of setting, for the same places and times.

4. What are the sun's altitude and azimuth at the following places and times:—Copenhagen, March 5th, 10 *a.m.*? Marquesas, July 7th, 3 *p.m.*? Pekin, August 12th, 7 *a.m.*? Batavia, January 1st, 11 *a.m.*? Cape of Good Hope, December 21st, 6 *p.m.*? Guadaloupe, June 4th, 8½ *a.m.*?

5. April 15th, in the afternoon, the sun's altitude at Madrid was 50°; required the hour and the azimuth.

6. At London, on May 1st, the sun's azimuth was S. 44½° E.; required the hour and the sun's altitude.

7. At Canton, on March 10th, the sun's azimuth was S. 74° E.; what were the hour and altitude.

8. At Jerusalem, on February 22nd, the sun's azimuth was S. 53° E.; required the hour and altitude.

9. At Rome, on March 10th, the sun's azimuth was S.E. 6° 24′ E.; required the hour and altitude.

10. In lat. 51½°, the sun's altitude was 46½°, on June 21st; required the hour and the azimuth.

11. At Oonalashka, on June 21st, in the evening, the sun's altitude was 10°; required the hour and the azimuth.

12. At London, what are the sun's altitude, and the hour, when it is due east or west on the longest day?

13. At London, on June 21st, how far from the north does the sun rise and set?

14. At Paris, on November the 5th, in the evening, the sun's altitude was 20°; required the hour and azimuth.

15. In the morning of June 21st, the sun's altitude at London was 46° 20′; what was the hour?

16. The sun being in the ascending signs, its altitude at Newcastle was observed to be 22°, when its azimuth was N. 87° W.; required the day of the month and the hour of the day.

17. At Stockholm, in the summer season, the sun's altitude was 12°, when its azimuth was N. 63° E.; required the day of the month and the hour of the day.

18. At Edinburgh, June 21st, how far from N. does the sun rise?

19. How many degrees are there between that point of the horizon in which the sun rises at Newcastle on June 21st, and that point in which it rises on December 21st?

20. In what part of the horizon does the sun rise at Quito, on June 21st and December 21st.

SECTION III.

OF PLANETS AND COMETS.

The planets are heavenly bodies which do not, like the fixed stars, shine by their own light, but by the reflection of the light of the sun. Eleven are at present known.

In the order of their distance from the sun they are—Mercury, Venus, the Earth, Mars, Vesta, Juno, Ceres, Pallas, Jupiter, Saturn, and Uranus. — Mercury and Venus, which are nearer the sun than the earth is, are called *inferior* planets, and the others which are more distant are called *superior* planets.

The inferior planets, in consequence of their comparative contiguity to the sun, are never seen in opposition to it: that is, they are never seen in the east when the sun is in the west, nor in the west when the sun is in the east; nor are they ever seen on the meridian at midnight. But the superior planets, whose orbits are much farther removed from the sun than that of the earth, are often seen in opposition to the sun.

All the planets, with the exception of Juno, Ceres, and Pallas, confine their movements to that zone of the heavens called the zodiac.

The obvious conclusion from this is, that the planes of the orbits of the planets are inclined to each other at very small angles, and that they *correspond very nearly* with the plane of the ecliptic.

The planets all move round the sun in the order of the signs, that is, from the west towards the east; but their apparent motion, as seen from the earth, is very irregular: (hence they are termed planets, or *wandering stars*:) sometimes it is from west to east, called *direct;* and sometimes from east to west, called *retrograde:* at other periods they appear for a while stationary. But this apparent irregularity is occasioned by their being viewed from a body which is itself in motion.

Suppose a person placed at the centre of a large circular area, and that several bodies are moving round that centre, all the same way, but at different distances from it, and with different velocities; these bodies, to the person placed at the centre, will all appear to be moving in the same direction; but if the person were placed at a distance from the centre, and carried round in one of those bodies, he would no longer see the rest moving in the same orderly manner as before. Such is the case with the planets seen from the sun, the centre of the system; they all pursue their regular courses from west to east:—but viewed from the earth, one of the moving bodies, their apparent motion is very different from the real.

The motion of the inferior planets may be very familiarly illustrated by carrying a small ball, or globe, round a circular wire, having placed a candle at a distance on one side, and a screen on the other, to receive the shadow of the ball. Whilst the ball is carried round the circle, without ever changing its course, the shadow against the screen moves backward and forward, something like the vibrations of a pendulum. Such is the case with Mercury and Venus; they keep moving backward and forward in that part of the heavens in which the sun is; Mercury never going farther from the sun than 29° and Venus than 47°.

To account for the retrograde motion of the superior planets, it may be observed, that when two bodies are moving the same way, with different velocities, that body which moves more slowly, seems to recede from the other, with a motion equal to the difference of their velocities: thus, whilst the earth and one of the superior planets, suppose Jupiter, are both moving eastward, (the planet being in opposition,) the earth moving faster than Jupiter, the latter is left behind: and, though his real motion is eastward, he appears to be moving from east to west.

The planets can only be seen when some part of their surface on which the sun shines is turned towards the observer. Hence the inferior planets present all the phases of the moon.

When Mercury or Venus is between the earth and the sun it is aid to be in its inferior conjunction. In this situation the whole of he enlightened portion of the planet is turned away from the earth, and t is invisible to us; but as it proceeds on its course a thin crescent of ight is presented to our view, which gradually passes into the half-mooned and gibbous form. When arrived at its superior conjunction, hat is, when the sun is interposed between the earth and it, the whole of its enlightened side is turned towards us, but in this situation its brilliancy is lost in the blaze of the sun's rays.

Mars is sometimes slightly gibbous, (*i. e.* something less than a circle, like the moon between the first and second quarter,) but with this exception, all the superior planets shine with a full disc. The reason of this is that they are so much further removed from the sun than the earth is, that in whatever part of its orbit the earth may be we see them nearly as we would view them from the sun itself.

The planets do not move in a circle, as the ancients and even as Copernicus supposed, but in an ellipse or oval, and they do not proceed in their course with a uniform velocity, but always move fastest when nearest the great source of attraction, the sun.

The laws of planetary motion, as originally discovered by Kepler, and usually called Kepler's three laws, are the following:—

1st. A line drawn from the centre of a planet to the centre of the sun describes equal areas round him in equal times.

2nd. The orbits of the planets are ellipses, having the sun in one of their foci.

3rd. The squares of the periodic times are proportional to the cubes of their mean distances from the sun.

The secondary planets or satellites obey the same laws as the primary. They all move from west to east except the satellites of Uranus, whose motions are supposed to be from east to west; and they all, so far as is known, occupy the same time in making a rotation upon their axis as in completing a revolution in their orbit; they consequently always present the same phase to their primary.

Mercury. ☿

This planet is nearer to the sun than any that has yet been discovered: it is seldom visible, being generally lost in the sun's rays: its diameter is about 3,200 miles, and distance from the sun 37 millions of miles. It rotates on its axis in 24 hrs. 5 m. It turns round the sun in 88 days, moving at the rate of about 110,000 miles per hour, or 30 miles per second; it receives its name from the extreme rapidity of its flight.

Mercury being so much nearer the sun than the earth is, the heat of the sun there will be 7 times greater than our summer heat. This being greater than the heat of boiling water, all the water on our globe would be evaporated, and every thing on its surface burnt to atoms, were it similarly situated. Hence any beings inhabiting it must be very different from us. The density of Mercury is very great, being rather greater than that of quicksilver. A cannon ball, passing at the rate of 20 miles in a minute, would take 3½ years in going from the sun to Mercury.

Venus. ♀

This planet receives its name from its extreme beauty: it may easily be known, from its being the most brilliant of all the planets, and from its rising before the sun in the morning, when it is a *morning star*, or setting after the sun in the evening, when it is an *evening star*. Venus and Mercury, when viewed through a telescope, have all the phases of the moon.

The diameter of Venus is nearly equal to that of the earth, being 7,800 miles: the length of its day is also nearly the same as that of ours, being 23 hours, 21 minutes, the time that it takes to turn on its axis. This is known by the spots on its surface. Its distance from the sun is 69 millions of miles; and it finishes its journey round the sun in 224 days, 16 hours, moving at the rate of 80,000 miles per hour, or, 23 m. per second. The light and heat of the sun at Venus are double that which is enjoyed by the inhabitants of this globe. A cannon ll would require more than 6 years in passing from e sun to Venus. The density of Venus is a little greater an that of the earth, and like the earth it possesses an mosphere. Venus, as well as Mercury, is sometimes en to pass over the sun's disc: this is called a transit, d it furnishes astronomers with the means of deter-ining the distances of all the planets. Captain Cook's rst voyage to the South Sea was undertaken for the pur-ose of observing, at Otaheite, the last transit of Venus, 1769. The next transit will be in 1874.

The reason that a transit of Venus does not take place at every revo-tion is, that its orbit does not coincide with that of the earth. A transit n only take place when the sun, earth, and Venus are in the same raight line, and this can never be excepting when the earth and enus happen to be both in the line of intersection of the planes of eir orbits, that is, when Venus is in her *nodes*.

The same observations are applicable to the transits of Mercury, hich take place at intervals of 6, 7, 13, 46, and 263 years.

It is obvious that no transits of the superior planets can occur, but the rth being an inferior planet to Mars, Jupiter, &c., will perform occa-onal transits to them.

The Earth. ⊕

The next planet in the order of distance from the sun s that which we inhabit. The equatorial diameter of the arth is 7,925, its polar 7,899 miles, and the number of quare miles upon its surface 197 millions. It turns upon ts axis in 23 hrs. 56 m. as indicated by its return to the ame star.

This period is called a siderial day. The mean solar day consists f 24 hrs., the additional 4 m. being required, as already explained, to ring any point on the earth's surface to the same position in regard to he sun. The length of the solar day is not uniform; this arises from he inequality in the rate of the earth's motion round the sun, and the nclination of the earth's axis to the plane of its orbit. (See Prob. XXX.)

Its mean distance from the sun is 95 millions of miles. It performs a revolution in its orbit in 365 d. 6 h. 9 m.

10 sec., moving at the rate of 68,000 miles per hour, which is more than 1,100 miles per minute, or 18½ m. per sec.

The equinoctial, or tropical year, which is the interval between two successive returns of the sun to the same equinox, consists of 365 d. 5 hrs. 48 m. 49 sec. The difference between the equinoctial and the siderial, or true year, is owing to a regression of the equinoctial points, which is caused by the attraction of the sun and moon upon the projecting matter at the equator. The *precession of the equinoxes*, as this motion is called, causes a slow change in the apparent position of the pole star. In about 12,000 years, Vega, the principal star in Lyra, will be very near the pole, and will consequently be the pole star. The pole of the heavens will make a complete revolution in about 26,000 years.

The earth is in its *perihelion*, or that part of its orbit nearest the sun, on Dec. 31st, and in its *aphelion*, or furthest from the sun, on July 1st. The sun is about 3 millions of miles nearer to us in the depth of winter than in the middle of summer.

It seems strange that we should have the coldest season when we are nearest to the source of heat, but it must be remembered that during winter the sun continues only a short time above the horizon, and his rays fall very obliquely upon the earth.

The earth is surrounded with a thin fluid called air, the whole body of which forms the atmosphere.

The lower parts of the atmosphere are denser than the higher; and the density diminishes, the greater the altitude; this it does so rapidly that at an elevation of 18,000 ft., which is nearly that of Cotopaxi, we have ascended through one-half the body of air incumbent on the earth's surface. It is owing to the atmosphere that the rays of light coming from the sun are dispersed in all directions, and thus the whole heavens become illuminated. Without an atmosphere, we should derive no benefit from the light of the sun, except when our sight was directed to him; all the other parts of the heavens would appear dark and the stars would be visible at noon-day. It is also the atmosphere that produces twilight, as already explained. By refracting the rays of light, it causes the sun to appear in the morning before he is above the horizon, and in the evening after he is set.

A cannon ball would take 9 years in passing from the sun to the earth.

The Moon. ☽

The moon is the constant companion of the earth in its annual revolution round the sun, and next to that body, it s to us the most remarkable in our system; it supplies us with light during the absence of the sun, and furnishes us with a measure of time. The mean distance of the moon from the earth is 240,000 miles; its diameter is 2,160, being to that of the earth as 3 to 11. It turns round the earth in 27 days, 7 hours, 43 minutes, and is carried round the sun with the earth in 1 year. Between one new moon and another are 29 days, 12 hours, 44 minutes; this is the foundation of the division of time into months. It turns round its axis in the same time, and hence it always presents the same face to us.

As the moon shines by borrowed light, and the enlightened part is not always turned towards the earth, it is only in one position that the moon appears round; this is, when it is in opposition to the sun, the whole of the enlightened side being then turned towards the earth: this appearance is called *full moon.* When it is in conjunction with the sun, the enlightened side is turned from us, and the moon is consequently invisible: this is called *new moon.* A few days after conjunction, it is seen in the shape of a crescent, and it gradually enlarges till the whole of the enlightened side appears. After full moon, it again loses its circular form, and the enlightened part decreases as before it increased.

As the moon affords light to the earth, so the earth, in return, affords light to the moon; but the surface of the earth being 13 times greater than that of the moon, it affords 13 times more light to the moon. The length of the day and night to the moon being nearly 30 of our days, the sun will be 15 days above the horizon, and the night will be of the same duration.

When the moon is only a few days old, the unenlightened part of it is, in favourable circumstances, partially visible. This phenomenon is caused by the light reflected from the earth—the moon's *earthlight*—which is then great, as the enlightened side of the earth is turned towards the moon.

Numerous mountains and caverns render the surface of the moon very uneven.

This fact is proved by the following considerations:—1. When the moon is horned, or gibbous, the boundary line of light and darkness is notched and broken, which is exactly the aspect that elevations and depressions would produce. 2. Close by the illuminated portion, yet within the dark part, there are small shining points which gradually join the luminous space and new ones appear. These are evidently the tops of mountains whose summits catch the illumination of the sun's rays before the plains below, just as Mont Blanc is enlightened while the Valley of Chamouni, at its foot, is in darkness. 3. Further evidence is afforded by the facts that the mountains project shadows in a direction from the sun, that the caverns are dark on the side nearest the sun and illuminated on the opposite side, and that the shadows shorten as the sun's rays became more direct, and lengthen as his beams fall more obliquely.

The form of the lunar mountains is various. There are many isolated peaks of a sugar-loaf form; one of these, Pico, is 7,000 ft. high. There are several mountain chains, but the most striking peculiarity in lunar mountains are ring fences, or circular ramparts, enclosing plains and hollows of various diameters, the most extensive having isolated peaks jutting from their bosom.

The moon is supposed to have neither atmosphere nor seas.

Beautiful as is the appearance of the moon as seen from the earth, the earth must be a still more striking object as seen from the moon.

If we could place ourselves in the middle of the lunar disc, we should enjoy a very singular spectacle; we should see our earth placed in the zenith, like a motionless lamp, or only turning on its axis; and we should probably be able to distinguish the continents, islands, &c., as they would reflect more light than the oceans.

Supposing the moon inhabited, the inhabitants of that hemisphere next the earth will always see the earth in the same place in the heavens, while the sun will appear to perform his revolution in a month. The inhabitants of the opposite hemisphere, on the contrary, will never see the earth; unless, prompted by curiosity, they make a journey to behold the extraordinary phenomenon.

Mars. ♂

Next to the earth is Mars. It may be known in the heavens by its dusky red appearance, which induced the ancients to give it the name of the God of War. Its diameter is little more than half that of the earth, being about 4,100 miles; but the length of its day is nearly the same as ours, for it turns on its axis in 24 hours 39 minutes. Its distance from the sun is about 145 millions of miles; the length of its year is equal to 687 days, and therefore it travels at the rate of 55,000 miles per hour. Mars has an atmosphere of considerable density. When viewed through a telescope, several spots are seen on its surface, some of which are permanent, others are not. Owing to its distance from the sun, the light and heat at Mars are only half of that which we enjoy. No moon has yet been discovered belonging to it. A cannon ball would take 13 years in passing from this planet to the sun.

Mars seems to shine with very different degrees of splendour. This is owing to the circumstance that in the course of its revolution it is situated at very different distances from the earth. When Mars is in opposition to the sun, it is only 50 millions of miles distant from us, but when it is in conjunction with the sun, it is 240 millions of miles distant from the earth. When nearest the earth, it presents a surface twenty-five times larger than when at its greatest distance.

Mars has a greater resemblance to the earth than any other planet in the system. Land and water diversify its surface. Owing to the inclination of its axis, it will have a change of seasons. White spots have been observed at its poles; these have been conjectured to be snow, as they disappear when they have been long exposed to the sun, and are greatest when just emerging from the long night of the polar winter of that planet.

THE ASTEROIDS.

None of the four minor planets is sufficiently large to be visible to the naked eye. They are distinguished from the older planets by several peculiarities. They are all nearly at the same distance from the sun, and complete a revolution round him in nearly the same time. They wander beyond the zodiac in consequence of their orbits being more inclined to the ecliptic than those of the other planets; their orbits are also more eccentric, and they cross one another.

Vesta (⚶) is about 225 millions of miles from the sun, and completes its revolution round it in 1,326 days. In size it resembles a star of the 5th magnitude.

Juno (⚵) is situated at about 253 millions of miles from the sun, and completes its revolution in 1593 days

Ceres (⚳) is very nearly 263 millions of miles from the sun, and performs its revolution in 1,681 days. Ceres was the first of the asteroids that was discovered, and was first noticed by M. Piazzi, astronomer at Palermo, in Sicily, 1st Jan. 1801.

Pallas (⚴) is a little more than 263 millions of miles from the sun, and turns round the sun in 1686 days.

Before the discovery of the asteroids, the existence of a planet between Mars and Jupiter had been conjectured. It was observed that the interval between the orbit of each planet and that of the next goes on doubling as we proceed from the centre of the system; but that the interval between Mars and Jupiter greatly exceeded the usual proportion. The attention of astronomers having been called to the circumstance, they were rewarded by the discovery of four small planets in the situation where they anticipated one large one to be. Some have supposed that the asteroids are the fragments of a larger orb which has been shattered by some internal convulsion.

Jupiter. ♃

We come now to Jupiter, the largest of all the planets, and which the Greeks dignified with the name of their chief deity. It is easily known by its peculiar magnitude and brilliancy. Its diameter is about 87,000 miles; and hence it is 1,300 times larger than the earth. It turns on its own axis in 9 hours 55 minutes; and revolves round the sun in 11 years 315 days, moving at the rate of about 30,000 miles per hour.

Being more than five times farther from the sun than the earth, viz., 494 millions of miles, the light and heat enjoyed by the inhabitants of Jupiter must be only the twenty-seventh part of that afforded by the sun to the earth. But this defect is partly supplied by 4 satellites, or moons, which constantly attend this planet, some of which will always be above the horizon. The density of Jupiter is little more than that of water. A cannon ball would take 47 years in passing from the sun to Jupiter.

The rotation of this planet on its axis is so rapid that the equatorial diameter exceeds the polar by 6,000 m. As the axis is very nearly perpendicular to the plane of its orbit, there will be no variety of seasons at Jupiter, and the days and nights will be constantly of equal length.

Jupiter, when viewed through a telescope, exhibits a series of dark zones or belts. They are variable, but are generally parallel to the equator of the planet. The dark belts are supposed to be the body of the planet, and the bright parts compact and undisturbed strata of clouds and vapour.

All the satellites of Jupiter, except the second, are rather larger than our moon; they were discovered by Galileo in January 1610. As they move in an orbit nearly parallel to the equator of the planet, they are always seen in a straight line coincident with the equator.

Eclipses of Jupiter's satellites happen very frequently. Sometimes they are seen passing before the planet and casting shadows on his disc, and sometimes disappearing behind the body or being hid in its shadow at a distance from it.

The eclipses of Jupiter's satellites were formerly much used in computing the longitude of places on earth. The time of an eclipse at Greenwich being given in the Nautical Almanac, and the time of the occurrence of the same eclipse at the place where longitude is required being ascertained by observation, the difference of time and hence of longitude can be deduced. This method is now little used, in consequence of the superior accuracy of that by lunar observations.

It was by the observation of the eclipses of Jupiter's satellites that the velocity with which light travels was ascertained. It was found that an eclipse occurred 8 m. sooner than the average time when the earth was nearest to Jupiter, and 8 m. later than the usual time when it was furthest from Jupiter. Hence it was inferred that light requires 16 m. to pass from the nearest to the furthest point of the earth's orbit, a distance of 95 millions of miles.

Saturn. ♄

Till within 70 years Saturn was considered the most remote planet in our system. It shines with a pale, dead light. Its diameter is about 79,000 miles; so that, in point of size, it is the second in the system. It exceeds the earth in bulk nearly 1,000 times. It turns on its axis in 10 hours 29 minutes. Its distance from the sun is 900 millions of miles; and it performs its journey round that luminary in a little less than 30 years, and consequently travels at the rate of 22,000 miles per hour.

Being between 9 and 10 times farther from the sun than the earth, it enjoys 90 times less light and heat; but the daylight there is not so small as we should suppose, for it has been calculated to be many hundred times greater than the light which we enjoy from our full moon.

The Great Creator of the universe seems to have indemnified the inhabitants of Saturn for their great distance from the sun, by giving them 7 moons, and also by surrounding the planet with two broad rings, which are probably of considerable importance in reflecting the light of the sun to the planet. These rings present a singular appearance when viewed through a telescope. The density of Saturn is about that of light wood. A cannon ball would take 85 years in passing from the sun to Saturn.

The breadth of the exterior ring of Saturn is 10,500 miles, and that of the interior 17,000. The interior ring is 19,000 m. distant from the body of the planet. The thickness of the rings is supposed to be about 100 miles. The rings rotate in a plane of their own in nearly the same time that the planet performs a revolution on its axis. The rings are clearly opaque bodies, for they throw a shadow on the body of the planet on the side nearest the sun, and receive the shadow of the planet on the opposite side.

Uranus. ♅

This planet was discovered, March 13th, 1781, by Sir W. Herschel. It is the third of the planets in point of magnitude; it has a diameter of 35,000 miles, and its volume is about 80 times that of the earth. Its distance from the sun is 1,800 millions of miles. It requires 84 years to perform its journey round that luminary, though it travels at the rate of nearly 16,000 miles per hour. The light and heat of the sun, at Uranus, is 368 times less than at the earth. Probably six satellites and certainly two attend this planet. A cannon ball would require 171 years in passing from it to the sun.

Before the discovery of this planet, astronomers conceived that a planet existed beyond the orbit of Saturn, for some inequalities in the motion of Jupiter and Saturn could not otherwise be accounted for. Herschel called this planet Georgium Sidus, in honour of George III., but foreign astronomers gave it the name of its great discoverer. Latterly the name Uranus—the most ancient of the heathen deities, and the father of Saturn—has been adopted, as being more in unison with the appellations of the other planets.

In two respects the satellites of Uranus offer remarkable peculiarities; they move in orbits nearly at right angles to the plane of the orbit of their primary, and in a direction from east to west.

The more easily to remember the relative distances of the planets, the following numbers, which are proportional to their mean distances from the sun, will be useful:

Merc.,	Venus,	Earth,	Mars,	Asteroids,	Jupiter,	Sat.,	Ura.
4	7	10	16	28	52	100	196

The mean distance of the earth being 95,000,000 miles, that of any other planet may be obtained by proportion.

The following illustration will convey to minds unaccustomed to contemplate millions of miles, a general impression of the relative magnitude and distance of the parts of our system.

Choose any well levelled field. On it place a globe, two feet in diameter; this will represent the Sun; Mercury will be represented by a grain of mustard seed on the circumference of a circle, 164 feet diameter for its orbit; Venus a pea, on a circle 310 feet in diameter; the Earth also a pea, on a circle of 430 feet; Mars a rather large pin's head, on a circle of 654 feet; Juno, Ceres, Vesta, and Pallas, grains of sand, in orbits of from 1,000 to 1,200 feet; Jupiter a moderate sized orange, in a circle nearly half a mile across; Saturn a small orange, on a circle of four-fifths of a mile; and Herschel a full sized cherry, or small plum, upon the circumference of a circle more than a mile and a half in diameter.

These views ought to humble man. How insignificant is this earth, the theatre of so many passions, and so much contention! How much blood is sometimes shed for the possession of a mere point!

COMETS.

Comets appear in very various aspects. The *head* consists of a nebulous mass of light containing a bright spot in its centre, called the *nucleus*. The more diffuse light surrounding the nucleus is called the *coma*, or hair, from which the word comet is derived. The *tail* consists of a stream of light proceeding from the head, generally directed towards the side most remote from the sun. It is often slightly curved, bending towards the region which the comet has left, and is usually most fully developed just after the comet has passed the perihelion. A tail is by no means an invariable appendage of a comet.

Comets are not like planets confined to the zodiacal belt, they move in all parts of the heavens, and they proceed in all directions, some pursuing a retrograde and others a direct course.

Comets revolve in extremely eccentric orbits, so that at one time they are very near the sun and at another very remote from it.

Those comets which have elliptic orbits, make regular revolutions round the sun in fixed periods, but there are some which seem to move in a curve that does not return into itself. These comets having come within the reach of the sun's attraction, move round him, again launch forth into boundless space, again to perform a temporary revolution round the sun of some other system.

Comets appear to consist of matter entirely gaseous.

The proof of this is pretty decisive. They have been found to make no sensible derangement (by attraction) in the motions of Jupiter's satellites, near which they have passed, while they themselves have been considerably diverted from their course. Stars of the 16th magnitude have been seen through the nucleus of some of them. Also they present no phases, which shows that light passes freely through them.

The most remarkable comets that have appeared in modern times are those of 1680 and 1811.

The comet of 1680 was seen by the illustrious Newton. He calculated that its tail was 123 millions of miles long, and that when nearest to the sun it was exposed to a heat 2,000 times greater than that of red hot iron. This comet is supposed to have been the same as that which appeared about the time of Cæsar's death (B.C. 44).

The comet of 1811 continued visible to the naked eye for more than three months. Its brilliant tail, at its greatest elongation, had an extent of 108 millions of miles by a breadth of 15 millions.

The precise nature of the orbits and the period of time occupied in traversing them, have been ascertained in the case of three comets, which have been named after the astronomers who investigated their courses and predicted their return—Halley's, Biela's, and Encke's.

Halley's comet appeared in the year 1682, and it has twice visited this part of the system since Halley's time, namely, in 1759 and 1835. It has a period of 75 or 76 years.

Biela's comet describes its orbit in 6¾ yrs. Encke's comet has a period of 3⅓ yrs. Both Encke's and Biela's comets are destitute of tail and nucleus.

A very interesting fact has been noticed in the case of Encke's comet. The time in which it completes a revolution round the sun is undergoing a progressive diminution, owing to the diminution of the size of its orbit. It is hence inferred that the comet meets in its passage through the system with a resisting medium, and that it will eventually be precipitated upon the sun's surface.

PROBLEM XXI.

To mark the Places of the Planets on the Globe, from having their longitude and latitude.

1. Look on the right-hand page of White's Ephemeris for the day of the month.

2. Find out the column marked at the top with the character of the planet whose place you are seeking; then, in that column, opposite to the day of the month, is the longitude of the planet for that day at noon.

3. The latitude is given, at the top of the page, for 5 days in every month, and seldom exceeds 2 or 3 degrees.

4. Find the longitude and latitude upon the globe and put on a small patch with the character of the planet;—and thus may all the planets be marked upon the globe for any day of the year.

Page 32 of White's Ephemeris is appropriated to the planet Uranus: its variations in longitude and latitude are so small, that they are given for only the first day in each month.

EXAMPLES.

1. What is the situation of the inferior planets for May 13, 1828?

Mercury,	♉	10°	54′	1°	17′ S.
Venus,	♋	7	53	3	3 N.

2. What is the situation of the superior planets on the same day?

Mars,	♑	13°	1′	1°	45′ S.
Jupiter,	♏	7	49	1	22 N.
Saturn,	♋	16	21	0	2 S.
Uranus,	♒	2	18	0	34 S.

3. Required the situation of all the planets for the first day of every month, during the present year.

PROBLEM XXII.

To find the Right Ascension and Declination of the Planets,—their Rising, Culminating, Setting, Amplitude, Azimuth, Altitude, &c. for a given day and place.

The situation of the planets being marked upon the globe for the given day, their right ascension, declination, &c., may be found the same way as for the fixed stars.

EXAMPLES.—1. Required the right ascension and declination of all the planets on November 13th, 1828.

	RIGHT ASCENSION.		DECLINATION.	
Mercury,	228°	0′	18°	0 S.
Venus,	188	0	1	39 S.

	RIGHT ASCENSION.	DECLINATION.
Mars,	321° 0′	16° 0′ S.
Jupiter,	231 0	18 0 S.
Saturn,	129 0	19 0 N.
Uranus,	301 0	21 0 S.

2. At what time did Saturn rise at London, on November 1st, 1828? *Ans.* 15 min. past 10 *p.m.*

3. When did Jupiter, Mars, and Venus, set at London, on February 2d, 1837?

4. Required the situation of the Planets for November 19th, 1838.

5. Which of the Planets were visible at Newcastle, November 25, 1837, and whether in the evening or morning?

PROBLEM XXIII.

To find when Jupiter and Venus are Morning, and when they are Evening Stars.

1. Find their situation, as before directed.

2. If it be to the east of the sun's place, they will be evening stars; if to the west, they will be morning stars.

EXAMPLES.—1. Were Jupiter and Venus morning or evening stars on Dec. 7th, 1828?

Ans. They were W. of the sun, and were morning stars.

2. During what time will Jupiter be a morning star this year, and what time will it be an evening star?

3. Required the same for Venus.

SECTION IV.

PROBLEMS RELATING TO THE MOON.

The motion of the moon is very irregular. This irregularity is occasioned by its being attracted both by the sun and by the earth. It does not move in the ecliptic, but its orbit forms with the ecliptic an angle of $5\frac{1}{4}^{\circ}$. The points where its orbit cuts the ecliptic are called its *nodes*, and are constantly changing.

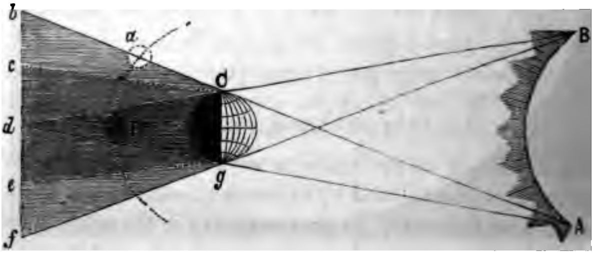
The course which the moon appears to pursue in the heavens is always varying. Passing in a month through all the signs of the zodiac, its meridian altitude will vary in that time 47°. The full moon that happens in Cancer is the most beneficial to us in the northern hemisphere, for its altitude is then the greatest, and it continues longest above the horizon: but when the full moon happens in Cancer, the sun is in Capricorn; and our days being then at the shortest, we are the most in want of auxiliary light. The full moon that is of the least use to us is in Capricorn, for its altitude is then the least, and its stay the shortest above the horizon: but the sun being then in Cancer, our days are long, and the light of the moon is not needed.

This is a wonderful display of the Divine wisdom and goodness, in apportioning the quantity of light suitable to the various necessities of the inhabitants of the earth, according to their different situations.

The full moon being always opposite to the sun, can never be seen by the inhabitants of the poles whilst the sun is above the horizon; but all the time the sun is below the horizon the full moons never set.

ECLIPSES.

An *eclipse of the moon* is caused by its entering into the earth's shadow. It can only happen at the time of *full*



ECLIPSE OF THE MOON.

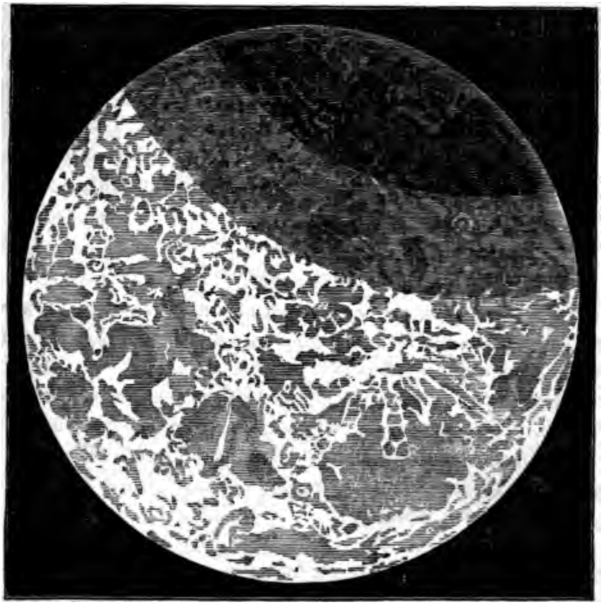
moon, or when in opposition to the sun, as the shadow of the earth must lie opposite to the sun.

The preceding figure will illustrate this.

Let A B represent the sun, and C *g* the earth. The moon, when at *a*, is just entering the earth's shadow, and the eclipse is then said to commence; at D, the moon is wholly enveloped in the shadow and is totally eclipsed.

When most obscure, the moon's disc is not entirely hid from us, for some of the solar light generally reaches it through the refracting influence of our own atmosphere.

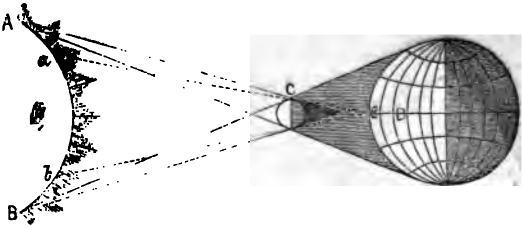
An observer who consults an almanack often expects an eclipse of the moon to begin long before he notices the earth's shadow to strike it. An inspection of the figure will explain the reason of this. Before the moon reaches the line *b* C it receives rays from the whole of the sun's surface, but after crossing that line, the portion of the sun's



MOON PARTIALLY ECLIPSED, EXHIBITING THE PENUMBRA.

disc from which it receives light is gradually diminished by the intervention of the earth; a shadow thus gently steals over the moon. It is only after crossing the line C *d* that all the sun's rays are cut off, and that it enters the *dark* shadow, and it is then only that an observer unprovided with a telescope detects the commencement of the eclipse. The conical dark shadow C *d g*, cast by the earth, is termed the *umbra*. The partial shadow, which gradually increases in intensity as the umbra is approached, is called the *penumbra* (almost shade). During the progress of an eclipse the penumbra always precedes and follows the umbra. The appearance of the penumbra, as seen through a telescope, is well depicted in the annexed wood-cut, allowance being made for a little necessary exaggeration in the depths of its shade.

An *eclipse of the sun* is caused by the interposition of the moon between the earth and sun, and therefore it must happen when the moon is in conjunction with the sun, or at the *new* moon.



ECLIPSE OF THE SUN.

When the sun A B, the moon C, and the earth D, are in the relative position represented in this figure, an eclipse of the sun takes place.

The eclipse may be *total*, when the whole of the sun's disc is obscure; partial when only a part of his surface is obscured; and *annular*, when the moon cuts off a circle in the middle, leaving a luminous ring (Latin *annulus*) around the part obscured

The wood-cut represents the circumstances in which an annular eclipse takes place. The moon's umbra falls short of the earth, and an observer at *e*, directing his eye along the upper edge of the moon will see the portion of the sun A *a*, unobscured; directing it past the lower edge, he will see the portion B *b*, and so of the whole circumference.

Frequently on the occurrence of an eclipse of the sun, the moon happens to be nearer to the earth than in the case supposed, and the umbra strikes the earth. The sun will then be totally eclipsed to an observer at *e*, and partially eclipsed to observers on each side of the conical umbra in a degree proportioned to their distance from it.

Lunar eclipses are visible in all parts of the earth which have the moon above their horizon, and are everywhere of the same magnitude and duration; but a solar eclipse is never seen throughout the whole hemisphere of the earth where the sun is visible; as the moon's disc is too small to hide the whole, or any part, of the sun from the whole disc or hemisphere of the earth. Nor does an eclipse of the sun appear the same in all parts of the earth where it is visible, but when in one place it is total in another it is partial.

If the moon moved in the ecliptic, there would be an eclipse of the moon every full moon, and an eclipse of the sun every new moon; but the moon being, in one part of its orbit, $5\frac{1}{4}^{\circ}$ to the north of the ecliptic, and in another part $5\frac{1}{4}^{\circ}$ to the south, there can be no eclipse except the moon, at full or change, be near its nodes. When the moon is less than 18° from either of the nodes at the time of change, there will be an eclipse of the sun; when it is less than 12° from either node at the time of full, there will be an eclipse of the moon.

These are called the *ecliptic limits;* and as they are nearly in the proportion of 3 to 2, there will be more solar than lunar eclipses in the same ratio. But more lunar than solar eclipses are seen at any place; because a lunar eclipse is visible to a whole hemisphere,—whereas a solar eclipse is visible only to a part. The greatest number of eclipses that can happen any year is 7, and of these, 5 will be of the sun, and 2 of the moon—the least number that can happen is 2, and these must be both solar: the mean number is about 4.—The season of eclipses will return at an interval of about 9 or 10 days less than half a year; so that, if there be eclipses about the middle of January, the next will be about the first week of July.

OF THE HARVEST MOON.

The moon rises about three quarters of an hour later on any day than on the day preceding; but in places of considerable latitude, there is a remarkable difference about the time of harvest, when, at the season of full moon, it rises for several nights together, only about 17 minutes later on one day than on the day preceding. By thus succeeding the sun before twilight is ended, the moon prolongs the light, to the great benefit of those who are engaged in gathering the fruits of the earth; and hence the full moon at this season is called the *harvest moon.* The full moon nearest the vernal equinox rises with the greatest difference of time, viz. an hour and a quarter later each day than on the former.—Problem XXIX. explains, by the globe, the phenomenon of the harvest moon; and Problem XXX. the equation of time.

PROBLEM XXIV.

To assign the Orbit of the Moon its proper situation in the Heavens for any given time.

1. Find the moon's ascending node in White's Ephemeris: the descending node will be 180° distant from that. At the distance of 90° from these nodes, reckoning each way, count $5\frac{1}{4}$° to the north of the ecliptic on one side, and $5\frac{1}{4}$° to the south on the other side.

2. Fasten a silk line round the globe, to cut the ecliptic at the nodes, and to pass over these two points, made at the distance of $5\frac{1}{4}$° on each side of the ecliptic; and this will represent the moon's orbit for the given day.

EXAMPLES.

1. Represent the moon's orbit for Oct. 25th, 1828.

The moon's ascending node is 15° 56′ in Libra, and the descending node will be 15° 56′ in Aries:—make the silk line cut the ecliptic in these two points; and at the distance of 90° from these points, let it be

5¼° to the north of the ecliptic on one side, and 5¼° to the south on the other side, and it will represent the orbit for that day.

2. Point out the moon's orbit for the present month.

PROBLEM XXV.

To find the Moon's Diurnal Motion in the Ecliptic for any given Day.

Find the moon's longitude for the given day, on the right-hand page of White's Ephemeris; subtract from this its longitude on the preceding day; or subtract this from the longitude of the succeeding day; and the difference will be the quantity of diurnal motion sought.

EXAMPLE.

Required the moon's diurnal motion Oct. 25, 1828.

October 25th, moon's longitude	♊	32°	52′
October 24th,	♉	19	32
Answ.		13	20

From the moon's diurnal motion may be found its longitude for any hour, by the rule of three; thus,

As 24 hours is to the quantity of daily motion, so is the number of hours to the quantity of motion in that time; for example,

Required the moon's longitude for Oct. 25th, 1828, at 9 *p.m.*

As 24 : 13° 20′ : : 9 : 5°, the motion in 9 hours.

The moon's longitude at noon will be ♊ 2° 52′; to this add 5° 0′, and its longitude, at 9 o'clock *p.m.* will be ♊ 7° 52′.

PROBLEM XXVI.

To mark upon the Globe the Moon's place in the Heavens for any given Day and Hour.

Find its longitude for the given hour by the last problem, and its latitude for the given day at noon from White's Ephemeris; put a small patch, with the moon's astronomical character marked upon it, on this place, and it will represent the moon.

The moon's declination, right ascension, altitude, azimuth, &c., may be found in the same way as the declination, &c. of the sun or stars, but not with equal accuracy, on account of the moon's motion.

Examples.—1. Required the moon's place for November 28th, 1828, at 8 hrs. *p.m.*

November 28th, moon's longitude at noon ♌ 24° 41
November 27th, ditto ♌ 12 49

Diurnal motion 11 52

As 24 hrs. : 11° 52′ : : 8 hrs. : 3° 57′.

The moon's longitude at 8 will be ♌ 28° 38′, and its latitude at noon, given in the Ephemeris, 3° 57′ S.

2. Required the moon's declination for the present day at midnight, and its altitude and azimuth at Newcastle, if it be above the horizon there at that time.

PROBLEM XXVII.

To find the Time of the Moon's Rising, Southing, and Setting, for any Latitude and given Day of the Year.

From the Ephemeris, find the moon's latitude and longitude for the given day, and put on a patch to represent its place; then its rising, southing, and setting may be found the same way as the rising, &c., of the stars.

EXAMPLES.

1. Find the moon's rising and southing on December 25th, 1828, at London. *Answ.* South 2 hrs. 56 min. *a.m.* Rises 8 hrs. 34 min. *p.m.*

2. Required the moon's rising, southing, and setting, at Newcastle, on December 28th, this year.

PROBLEM XXVIII.

To find the Time of the Year when the Sun or Moon will be liable to be Eclipsed.

1. Compare the sun's longitude, at the time of new

moon, with the place of the moon's nodes: and if it be within 18″, there may be an eclipse of the sun.

2. Compare the same at the time of full moon; and if it is within 12°, there may be an eclipse of the moon.

Examples.—1. Was the sun eclipsed in April, 1828?

Answ. New moon happened on the 14th; the place of the moon's node on that day was ♈ 26° 15′, the sun's longitude was ♈ 24° 29′; hence the moon was within 2° of its node, and an eclipse took place.

2. Was the moon eclipsed in December, 1838?

Ans. Full moon happened on the 30th: the moon's nodes on that day were ♒ 29° 21′, and ♌ 29° 21′; the sun's longitude ♍ 8° 25′: hence the moon was 99° 4′ from its nearest node, and consequently no eclipse took place.

3. Find, by the globe, what eclipses of the sun or moon will happen this year.

PROBLEM XXIX.

To explain the Phenomena of Harvest Moon.

Elevate the globe for any northern latitude, suppose for *Newcastle.*

In September, when the sun is in the beginning of Libra, the moon, at full, must be in or near the beginning of Aries: and as the mean motion of the moon is 13° in a day, put a patch on the first point of Aries, and another 13° beyond it on the ecliptic: this last will point out the moon's place the first night after full. Its place on the second, third, &c., night may be found by putting more patches at the distance of 13° from each other.

Bring the first patch to the horizon, and observe the hour: turn the globe till the second patch come to the horizon, and the index will show that it rises only 17 minutes later than the former. Thus 17 m. is the difference of the moon's rising on two successive nights. The other patches will come to the horizon, in little more

than that time, after each other; which sho
difference of the moon's rising several nights
is little more than 17 m. each night. The d
the moon's rising for a week will not be 2 hrs

The small angle which that part of the moon's orbit
horizon is the reason of its rising at that season, for sev
with so small a difference of time.

That part of the moon's orbit near Libra makes the
with the horizon; and the full moon that happens in
the greatest difference of time. This may be seen by p
on the globe, from the first of Libra, to represent the m
several successive nights,—when it will be seen that th
rising in two evenings will be 1 hour 17 minutes.

That point of the ecliptic which rises at the least ang
rizon, sets at the greatest; and therefore when there i
ference in the time of rising, there will be found to be
the time of setting.

EXAMPLES.

Required the difference in the times of
moon's rising for seven days successively, at

1. St. Petersburg, 3. Londo
2. Edinburgh, 4. Gibral

PROBLEM XXX.

To explain by the Globe the Equation of

Mean, or *equal* time is measured by a cl
supposed to go without variation, and to mea
24 hours from noon to noon. *Apparent* time
as measured by a good sun-dial.

The sun's motion being in the ecliptic, an
equator, and equal portions of the ecliptic
the meridian in unequal times, causes a di
tween *equal* and *apparent* time: the adjust
difference is called the *equation of time.*

To show this upon the globe, make penci
round the equator and ecliptic, at equal dist
pose 15°) from each other, beginning with Ari

Then, on turning the globe, you will perceive that all the marks on the first quadrant of the ecliptic, that is, from Aries to Cancer, come sooner to the brass meridian than their corresponding marks on the equator. Now time, as measured by the dial, is represented by marks on the ecliptic; that measured by a good clock, by those on the equator: hence, whilst the sun is in the first quarter of the ecliptic, the dial is faster than the clock.

On turning the globe, it will be found that the marks on the second quarter of the ecliptic, that is, from Cancer to Libra, come to the meridian later than those on the equator; and consequently the sun is slower than the clock. So it will be seen, that in the third quarter, from Libra to Capricorn, the sun is faster; and in the fourth quarter, from Capricorn to Aries, slower than the clock.

The earth's motion in its orbit not being uniform, is another cause of difference between mean and apparent time. The equation of time is given for every day in White's Ephemeris, and in most almanacks. The days when the clock and sun agree, are April 15th, June 15th, Sept. 1st, and Dec. 24th. The days of greatest difference are Feb. 11th, May 15th, July 26th, and Nov. 3rd.

QUESTIONS FOR EXAMINATION IN SECTIONS III. AND IV.

What is the literal signification of the word *planet?* How many planets are there, and in what order do they move round the sun? How many are called *inferior planets,* and why are they so called? Which of them are called *superior planets,* and why are they so called? Which of them are called Asteroids?

Are Mercury and Venus ever seen in the west in the morning, or in the east in the evening? Which of the planets may be seen on the meridian at midnight?

How do the planets appear to move as seen from the earth? What is the greatest distance, in degrees, that Mercury and Venus ever appear from the sun?

What is Mercury's mean distance from the sun? What is its diameter? How long does it take to turn round the sun? How long to turn on its own axis? What are the distances, diameters, and periods of the other large planets? How much greater is the heat of the sun at Mercury than upon our earth?

much more light does the earth afford to the moon,
does to the earth?

How may Mars be known in the heavens?

How much less light does the sun afford to Jupiter th
is this defect supplied?

What appearance has Saturn in the heavens? H
has Saturn? In what respect does this planet differ fro

Which is the most remote planet yet discovered b
system? How much light does the sun give to this
many moons belong to it? What peculiarities have th

What are the names of the four minor planets? V
discovered? Wherein do they differ from the other pla

What are the parts of a comet? What is the usual f
of a comet? Name the most remarkable comets of
What interesting fact has Encke's comet revealed?

What is it that causes an eclipse of the moon? Of t

Supposing the north pole to be inhabited, how long
habitants uninterruptedly enjoy the light of the moon in

Within how many degrees of the nodes must the moo
of change, to produce an eclipse of the sun? Within
grees, at full moon, to produce an eclipse of the moon?

What is the greatest and least number of eclipses that
any year, and how many of these must be of the sun?

How may the moon's orbit be represented on the glob
the moon's diurnal motion in the ecliptic be found?

A TABLE

OF

E LATITUDES AND LONGITUDES

OF THE

PLACES MENTIONED IN THE PROBLEMS.

nes of Places.	*Sea or Country.*	*Latitude.*	*Longitude.*
lco	Mexico	16° 50′ N	99° 46′ W
ople	Turkey	41 45 N	26 38 E
an	Turkey	46 12 N	30 12 E
(S. Pt.)	North America	55 0 N	160 0 W
	Syria	36 11 N	37 10 E
dria	Egypt	31 13 N	29 55 E
	Barbary	36 48 N	3 4 E
t	Spain	38 21 N	0 28 W
rdam	Holland	52 22 N	4 54 E
a	Italy	43 36 N	13 32 E
	Trans-Gangetic India	20 44 N	93 26 E
ngel	Russia	64 34 N	40 43 E
sion (Is.)	Atlantic Ocean	7 56 S	14 13 W
han	Russia	46 30 N	48 0 E
sca (R.)	North America	57 0 N	111 20 W
	Greece	37 58 N	23 43 E
	Birmah	21 51 N	95 58 E
	Russia	47 0 N	39 0 E
(Is.)	Atlantic Ocean	38 0 N	26 0 W
d	Turkey in Asia	33 25 N	44 35 E
loes	West Indies	13 5 N	59 43 W
ona	Spain	41 25 N	2 9 E
	Corsica	42 41 N	9 26 E
a	Java	6 9 S	106 52 E
s	India	25 20 N	83 2 E
olen	Sumatra	3 48 S	102 0 E
r	Russia	46 45 N	29 40 E
	Norway	60 24 N	5 20 E
	Prussia	52 31 N	13 12 E
das	Atlantic Ocean	32 22 N	64 30 W

Names of Places.	*Sea or Country.*	*Latitude.*
Berne	Switzerland	46° 56′ N
Bhering's Island	Pacific Ocean	55 0 N
Bilboa	Spain	43 14 N
Birmingham	England	52 29 N
Bombay	India	18 54 N
Borneo	Pacific Ocean	4 55 N
Boston	United States	42 24 N
Botany Bay	New Holland	34 0 S
Bordeaux	France	44 50 N
Bremen	Germany	53 5 N
Brest	France	48 23 N
Bristol	England	51 27 N
Buenos Ayres	South America	34 36 S
Brusa	Asia Minor	40 10 N
Cadiz	Spain	36 32 N
Caen	France	49 10 N
Cairo	Egypt	30 0 N
Calais	France	50 56 N
Calcutta	India	22 34 N
Calicut	Malabar, India	11 15 N
California	North America	27 0 N
Canary (Is.)	Atlantic Ocean	28 15 N
Candia	Candia Is. Mediter.	35 18 N
Canton	China	23 8 N
C. Blanco	Africa	21 20 N
C. Bojador	Africa	26 12 N
C. Charles	Labrador	52 20 N
C. Charles	United States	37 14 N
C. Chudleigh	Labrador	60 30 N
C. Coast Castle	Guinea	5 15 N
C. Comorin	India	8 5 N
C. Farewell	Greenland	59 45 N
C. Finisterre	Spain	42 54 N
C. Good Hope	Africa	34 30 S
C. Horn	South America	55 25 S
C. Matapan	Greece	36 23 N
C. South	New Zealand	47 0 S
C. St. Mary	Madagascar	25 35 S
C. St. Roque	Brazil	5 0 S
C. Vela	South America	12 5 N
C. Verd	North Atlantic	16 0 N

nes of Places.	*Sea or Country.*	*Latitude.*	*Longitude.*
ath	Scotland	58° 36′ N	4° 57′ W
e	England	54 52 N	2 55 W
rona	Sweden	56 10 N	15 32 E
	Siberia	55 44 N	49 8 E
ar	Chinese Tartary	40 55 N	72 50 E
ne	French Guayana	4 50 N	52 15 W
ston	United States	32 50 N	80 0 W
on	Russia	46 52 N	32 48 E
iana	Norway	59 55 N	10 48 E
iansand	Norway	58 8 N	8 3 E
mas (Is.)	Pacific	1 57 N	157 35 W
hill (Fort)	Hudson's Bay	58 48 N	93 12 W
bo	Ceylon	7 2 N	79 55 E
antinople	Turkey	41 1 N	28 55 E
s Strait	New Zealand	41 0 S	175 0 E
hagen	Denmark	55 41 N	12 35 E
rmine R. mouth.	North America	69 0 N	115 30 W
h	Greece	37 58 N	22 54 E
	Ireland	51 55 N	8 32 W
a	Mediterranean	42 12 N	9 0 E
na	Spain	43 23 N	8 18 W
scus	Syria	33 27 N	36 25 E
ic	Prussia	55 20 N	18 38 E
n (Isth.)	America	9 0 N	77 30 W
	India	28 40 N	77 5 E
rara	South America	6 0 N	58 15 W
(Is.)	Davis's Straits	69 50 N	54 30 W
	England	51 7 N	1 19 E
en	Saxony	51 2 N	13 43 E
n	Ireland	53 23 N	6 20 W
irk	France	51 2 N	2 22 E
Cape	Siberia	67 0 N	170 0 E
r Island	Pacific Ocean	27 9 S	109 25 W
urgh	Scotland	55 57 N	3 11 W
re	Denmark	56 2 N	12 38 E
avour (R.)	New Holland	15 25 S	145 17 E
nd (Is.)	Atlantic	51 24 S	59 56 W
	Canaries	27 47 N	17 47 W
osa (Is.)	Pacific	23 30 N	121 0 E
fort on Maine	Prussia	50 8 N	8 34 E
dly (Is.)	Pacific	19 0 S	174 0 W
va	Switzerland	46 12 N	6 9 E

Names of Places.	*Sea or Country.*	*Latitude.*	*Lo*
Genoa	Italy	44° 25′ N	8
Gibraltar	Spain	36 6 N	
Gilolo (Is.)	Indian Ocean	0 40 N	12
Glasgow	Scotland	55 51 N	
Gottenburg	Sweden	57 42 N	11
Gottingen	Germany	51 31 N	9
Greenwich	England	51 28 N	0
Guadaloupe (Is.)	Caribbean Sea	16 15 N	6
Guam (Is.)	North Pacific	13 20 N	14
Halifax	Nova Scotia	44 40 N	6
Hamburgh	Germany	53 32 N	9
Hanover	Germany	52 30 N	9
Havannah	West Indies	23 8 N	8
Havre de Grace	France	49 30 N	0
Hecla (Mount)	Iceland	63 52 N	1
Hispaniola, Hayti, or St. Domingo	West Indies	18 30 N	6
Hull	England	53 45 N	6
Irkutsk	Asiatic Russia	52 16 N	104
Iscanderoon	Syria	37 0 N	36
Ismail	Russia	45 21 N	28
Ispahan	Persia	32 25 N	51
Jago	Cape Verd Islands	15 10 N	23
Jamaica	West Indies	18 10 N	77
Jeddo or Yeddo	Japan Islands	36 29 N	140
Jerusalem	Syria	31 48 N	35
Jesso	Japan Sea	42 2 N	143
Juan Fernandez	Pacific	33 40 S	78
Kerguelens (Is.)	Indian Ocean	48 41 S	69
Kingston	Jamaica	18 0 N	76
Konigsberg	Prussia	54 42 N	20
Ladrone (Is.)	Chinese Sea	21 57 N	113
Lancaster	England	54 4 N	2
Lassa	Tibet	29 30 N	91
Leghorn	Italy	43 33 N	10
Leipsic	Saxony	51 20 N	12
Lima	Peru	12 3 S	77
Lisbon	Portugal	38 42 N	9
Liverpool	England	53 24 N	2
Lizard Point	England	49 57 N	5
London	England	51 30 N	0
Lubec	Germany	53 51 N	10

s of Places.	Sea or Country.	Latitude.	Longitude.
	France	45° 47′ N	4° 46′ E
	China	22 10 N	113 31 E
gascar (N. Pt.)	Indian Ocean	19 30 S	46 20 E
ra (Is.)	North Atlantic	32 37 N	16 58 W
s	India	13 4 N	80 22 E
d	Spain	40 25 N	3 33 W
eburgh	Saxony	52 8 N	11 38 E
lan's Strait	South America	52 24 S	69 0 W
and	Shetland	60 30 N	1 30 W
ca	East Indies	2 20 N	102 5 E
a	Spain	36 43 N	4 25 W
	Mediterranean	35 53 N	14 30 E
a	Philippine Islands	14 6 N	120 58 E
esas	Pacific Ocean	9 0 S	140 0 W
illes	France	43 17 N	5 22 E
ique	West Indies	14 35 N	61 5 W
tius	Indian Ocean	20 9 S	57 22 E
	Arabia	21 18 N	40 15 E
a	Arabia	24 40 N	39 40 E
le (Is.)	Polar Sea	75 0 N	110 0 W
l	Russia	55 42 N	21 8 E
o	North America	19 25 N	99 5 W
nao	Philippine Islands	7 30 N	125 0 E
	Arabia	13 20 N	43 20 E
w	Russia	55 50 N	37 40 E
h	Germany	48 8 N	11 36 E
n	China	32 4 N	118 47 E
	Italy	40 50 N	14 15 E
nne	France	43 15 N	3 0 E
	Siberia	58 30 N	83 0 E
no	Greece	36 53 N	21 45 E
itor's Islands	South Pacific Ocean	14 9 S	169 1 W
stle	England	54 58 N	1 37 W
Caledonia	South Pacific Ocean	22 0 S	166 0 E
Orleans	United States	29 57 N	90 11 W
York	United States	40 42 N	73 59 W
	Italy	43 41 N	7 16 E
a Sound	North America	49 35 N	126 37 W
k (Is.)	South Pacific Ocean	29 1 S	168 10 E
Cape	Lapland	71 10 N	26 0 E
Zembla	Arctic Ocean	72 0 N	60 0 E
sk	Siberia	59 20 N	143 12 E

Names of Places.	*Sea or Country.*	*Latitude.*	
Olmutz	Austria	49 33 N	
Oonalashka	North Pacific Ocean	53 30 N	1
Oporto	Portugal	41 8 N	
Oran	Africa	35 50 N	
Ormuz (Is.)	Persian Gulf	27 7 N	
Otaheite	Society Isles	17 29 S	1
Owhyhee (N. point.)	Sandwich Islands	20 17 N	1
Oxford	England	51 45 N	
Panama	America	8 58 N	
Paramariboo	South America	6 0 N	
Paris	France	48 50 N	
Pegu	Birmah	17 45 N	
Pekin	China	39 55 N	1
Pelew (Is.)	Pacific Ocean	6 53 N	1
Perpignan	France	42 42 N	
Petersburgh (St.)	Russia	59 56 N	
Philadelphia	United States	39 56 N	
Philippine (Is.)	Pacific	12 0 N	1
Pico	Azore Islands	38 38 N	
Pitcairn's (Is.)	Pacific Ocean	25 4 S	1
Plymouth	England	50 22 N	
Poictiers	France	46 35 N	
Polotsk	Russia	55 30 N	
Pondicherry	India	11 56 N	
Porto Bello	South America	9 34 N	
Port Jackson	New Holland	33 40 S	1
Port Mahon	Minorca	39 51 N	
Port Royal	Jamaica	17 58 N	
Port Sir Fr. Drake	New California	38 45 N	1
Portsmouth	England	50 48 N	
Potosi	Bolivia	19 45 S	
Prague	Austria	50 5 N	
Presburg	Austria	48 12 N	
Quebec	Canada	46 47 N	
Queen Charlotte's Sd.	New Zealand	41 6 S	1
Queen Charlotte's Is.	North Pacific	53 0 N	1
Quito	Colombia	0 13 S	
Revel	Russia	59 27 N	
Rhode (Is.)	United States	41 30 N	
Rhodes (Is.)	Archipelago	36 27 N	
Riga	Russia	56 57 N	
Rio Janeiro	Brazil	22 53 S	

of Places.	*Sea or Country.*	*Latitude.*	*Longitude.*
le	France	46 9 N	1 9 W
	Italy	41 53 N	12 29 E
and	Tartary	39 37 N	64 9 E
ch (Is.)	Pacific Ocean	20 0 N	157 0 W
e de Bogota	Colombia	4 37 N	74 10 W
House	Hudson's Bay	56 10 N	88 0 W
	Persia	29 45 N	52 15 E
bury	England	52 42 N	2 43 W
	India	14 30 N	101 10 E
Leone	Africa	8 30 N	13 15 W
ore	Malaya	1 30 N	104 0 E
a	Asia Minor	38 25 N	27 6 E
Islands	Pacific Ocean	17 0 S	151 0 W
rgen	Arctic Ocean	79 0 N	16 0 E
istopher's (Is.)	West Indies	17 2 N	62 43 W
lena	South Atlantic	15 55 S	5 43 W
n's	Newfoundland	47 33 N	52 39 W
lo	France	48 40 N	2 0 W
l's (Is.)	Indian Ocean	38 42 S	77 18 E
vador	West Indies	24 20 N	75 40 W
olm	Sweden	59 20 N	18 3 E
nd	Prussia	54 18 N	13 3 E
rgh	France	48 32 N	7 45 E
	India	21 10 N	73 12 E
n	Guyana	5 0 N	55 30 W
se	Sicily	37 2 N	15 16 E
fe	Canaries	28 17 N	16 29 W
(Is.)	Ladrone Islands	15 0 N	146 0 E
	West Indies	11 15 N	60 40 W
k	Russia	58 0 N	68 15 E
	Siberia	56 30 N	84 10 E
aboo	Friendly Isles	21 7 S	175 12 W
	Russian Finland	65 50 N	24 12 E
Straits	New Guinea	10 0 S	142 0 E
	France	43 7 N	5 55 E
ebar	India	11 0 N	79 53 E
malee	Ceylon	8 33 N	81 22 E
d (Is.)	West Indies	10 30 N	61 30 W
o	Peru	8 0 S	78 35 W
	Africa	36 44 N	10 22 E
	Italy	45 5 N	7 40 E
	Germany	49 54 N	8 8 E

Names of Places.	*Sea or Country.*	*Latitude.*	*L*
Upsal	Sweden	60 0 N	
Ushant (Is.)	France	48 28 N	
Valentia	Spain	39 21 N	
Van Dieman's Land, Hobart Town	New Holland	42 54 S	1
Venice	Italy	45 26 N	1
Vera Cruz	Mexico	19 11 N	9
Vesuvius (Mt.)	Italy	40 48 N	1
Vienna	Germany	48 12 N	1
Vologda	Russia	59 10 N	4
Warsaw	Poland	52 12 N	2
Washington	United States	38 55 N	7
Yarmouth	England	52 37 N	
York	England	53 57 N	

TABLE I.

Showing the Declination of the Sun for every Day in the Year.

Days.	MONTHS.											
	Jan. South.		Feb. South.		March. S. & N.		April. North.		May. North.		June. North.	
1	23°	3′	17°	12′	7°	43′	4°	23′	14°	57′	22°	0′
2	22	58	16	55	7	21	4	47	15	15	22	8
3	22	53	16	38	6	58	5	10	15	33	22	16
4	22	47	16	20	6	35	5	33	15	51	22	24
5	22	40	16	2	6	12	5	55	16	8	22	31
6	22	33	15	44	5	48	6	18	16	25	22	37
7	22	26	15	25	5	25	6	41	16	42	22	43
8	22	18	15	6	5	2	7	3	16	59	22	49
9	22	10	14	47	4	38	7	26	17	15	22	55
10	22	1	14	28	4	15	7	48	17	31	23	0
11	21	52	14	8	3	51	8	10	17	47	23	4
12	21	43	13	49	3	28	8	32	18	2	23	8
13	21	33	13	29	3	4	8	54	18	17	23	12
14	21	23	13	8	2	41	9	16	18	32	23	16
15	21	12	12	48	2	17	9	37	18	46	23	19
16	21	1	12	27	1	53	9	59	19	0	23	21
17	20	49	12	6	1	30	10	20	19	14	23	23
18	20	37	11	45	1	6	10	41	19	28	23	25
19	20	25	11	24	0	42	11	2	19	41	23	26
20	20	12	11	3	0	19	11	23	19	54	23	27
21	19	59	10	41	0	5N	11	43	20	6	23	28
22	19	46	10	20	0	29	12	4	20	18	23	28
23	19	32	9	58	0	52	12	24	20	30	23	28
24	19	18	9	36	1	16	12	44	20	42	23	27
25	19	3	9	13	1	40	13	3	20	53	23	26
26	18	48	8	51	2	3	13	23	21	4	23	24
27	18	33	8	29	2	27	13	42	21	14	23	22
28	18	18	8	6	2	50	14	1	21	24	23	20
29	18	2			3	14	14	20	21	34	23	17
30	17	46			3	37	14	39	21	43	23	14
31	17	29			4	0			21	52		

TABLE I. (CONCLUDED.)

Showing the Declination of the Sun for every Day in the Year.

Days.	MONTHS.											
	July. North.		Aug. North.		Sept. N. & S.		Oct. South.		Nov. South.		Dec. South.	
1	23°	10′	18°	10′	8°	28′	3°	1′	14°	19′	21°	46′
2	23	6	17	55	8	6	3	24	14	38	21	55
3	23	2	17	39	7	44	3	48	14	57	22	4
4	22	57	17	24	7	22	4	11	15	16	22	13
5	22	52	17	8	7	0	4	34	15	35	22	21
6	22	46	16	52	6	38	4	57	15	53	22	28
7	22	40	16	35	6	15	5	20	16	11	22	35
8	22	34	16	18	5	53	5	43	16	29	22	42
9	22	27	16	1	5	30	6	6	16	46	22	48
10	22	20	15	44	5	7	6	29	17	3	22	54
11	22	12	15	26	4	45	6	52	17	20	23	0
12	22	4	15	9	4	22	7	15	17	37	23	5
13	21	56	14	51	3	59	7	37	17	53	23	9
14	21	47	14	32	3	36	8	0	18	9	23	13
15	21	38	14	14	3	13	8	22	18	25	23	17
16	21	28	13	55	2	50	8	44	18	40	23	20
17	21	18	13	36	2	26	9	7	18	55	23	22
18	21	8	13	17	2	3	9	29	19	9	23	24
19	20	58	12	57	1	40	9	50	19	24	23	26
20	20	47	12	38	1	16	10	12	19	38	23	27
21	20	36	12	18	1	53	10	34	19	52	23	28
22	20	24	11	58	0	30	10	55	20	5	23	28
23	20	12	11	38	0	6	11	16	20	18	23	28
24	20	0	11	17	0	17S	11	37	20	30	23	27
25	19	47	10	57	0	41	11	58	20	42	23	26
26	19	34	10	36	1	4	12	19	20	54	23	24
27	19	21	10	15	1	28	12	40	21	5	23	22
28	19	7	9	54	1	51	13	0	21	16	23	19
29	18	53	9	33	2	14	13	20	21	27	23	16
30	18	39	9	11	2	38	13	40	21	37	23	13
31	18	25	8	50			14	0			23	9

TABLE II.

Of the Sun's Right Ascension.

Days.	Jan.	Feb.	March.	April.	May.	June.	Days.
	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	
1	18 43	20 56	22 49	0 43	2 34	4 37	1
2	18 48	21 0	22 53	0 46	2 38	4 41	2
3	18 52	21 4	22 56	0 50	2 42	4 45	3
4	18 57	21 8	23 0	0 54	2 45	4 49	4
5	19 1	21 12	23 4	0 57	2 49	4 53	5
6	19 6	21 16	23 8	1 1	2 53	4 57	6
7	19 10	21 20	23 11	1 4	2 57	5 1	7
8	19 14	21 24	23 15	1 8	3 1	5 5	8
9	19 19	21 28	23 19	1 12	3 5	5 9	9
10	19 23	21 32	23 22	1 16	3 9	5 14	10
11	19 27	21 36	23 26	1 19	3 12	5 18	11
12	19 32	21 40	23 30	1 23	3 16	5 22	12
13	19 36	21 44	23 33	1 26	3 20	5 26	13
14	19 40	21 48	23 37	1 30	3 24	5 30	14
15	19 45	21 52	23 41	1 34	3 28	5 34	15
16	19 49	21 56	23 44	1 38	3 32	5 38	16
17	19 53	21 59	23 48	1 41	3 36	5 43	17
18	19 57	22 3	23 52	1 45	3 40	5 47	18
19	20 2	22 7	23 55	1 49	3 44	5 51	19
20	20 6	22 11	23 59	1 52	3 48	5 55	20
21	20 10	22 15	0 3	1 56	3 52	5 59	21
22	20 15	22 19	0 6	2 0	3 56	6 3	22
23	20 19	22 23	0 10	2 4	4 0	6 8	23
24	20 23	22 27	0 13	2 7	4 4	6 12	24
25	20 27	22 30	0 17	2 11	4 8	6 16	25
26	20 31	22 34	0 21	2 15	4 12	6 20	26
27	20 35	22 38	0 24	2 19	4 16	6 24	27
28	20 40	22 42	0 28	2 22	4 20	6 28	28
29	20 44	22 45	0 32	2 26	4 24	6 33	29
30	20 48		0 35	2 30	4 28	6 37	30
31	20 52		0 39		4 32		31

TABLE II. (CONCLUDED.)

Of the Sun's Right Ascension.

Days.	July.		Aug.		Sept.		Oct.		Nov.		De
	H.	M.	H.	M.	H.	M.	H.	M.	H.	M.	H.
1	6	41	8	46	10	42	12	30	14	26	16
2	6	45	8	49	10	45	12	33	14	30	16
3	6	49	8	53	10	49	12	37	14	34	16
4	6	53	8	57	10	53	12	41	14	38	16
5	6	57	9	1	10	56	12	44	14	42	16
6	7	1	9	5	11	0	12	48	14	46	16
7	7	6	9	9	11	3	12	52	14	50	16
8	7	10	9	12	11	7	12	55	14	54	17
9	7	14	9	16	11	11	12	59	14	58	17
10	7	18	9	20	11	14	13	3	15	2	17
11	7	22	9	24	11	18	13	6	15	6	17
12	7	26	9	28	11	21	13	10	15	10	17
13	7	30	9	31	11	25	13	14	15	14	17
14	7	34	9	35	11	29	13	18	15	18	17
15	7	38	9	39	11	32	13	21	15	22	17
16	7	42	9	43	11	36	13	25	15	27	17
17	7	46	9	46	11	39	13	29	15	31	17
18	7	50	9	50	11	43	13	32	15	35	17
19	7	54	9	54	11	47	13	36	15	39	17
20	7	58	9	58	11	50	13	40	15	43	17
21	8	2	10	1	11	54	13	44	15	47	17
22	8	6	10	5	11	57	13	48	15	52	18
23	8	10	10	9	12	1	13	51	15	56	18
24	8	14	10	12	12	5	13	55	16	0	18
25	8	18	10	16	12	8	13	59	16	4	18
26	8	22	10	20	12	12	14	3	16	9	18
27	8	26	10	23	12	15	14	7	16	13	18
28	8	30	10	27	12	19	14	11	16	17	18
29	8	34	10	31	12	23	14	14	16	22	18
30	8	38	10	34	12	26	14	18	16	26	18
31	8	42	10	38			14	22			18

TABLE III.

Of the mean Right Ascensions in time, declinations, and magnitudes of 40 *remarkable Fixed Stars; with their names, and literal characters.*

Names of the Stars.	Ch.	M.	Rt. Ascen.		Declinat.	
Pole star, Alruccabah	α	2	0h	52m	88°	14′ N
Andromeda's Girdle, Mirach	β	2	0	59	34	33 N
Andromeda's Foot, Almaach	γ	2	1	51	41	22 N
Ram's Following Horn	α	2	1	56	22	31 N
Whale's Jaw, Menkar	α	2	2	51	3	18 N
Medusa's Head, Algol	β	2	2	55	40	10 N
Perseus' Side, Algenib	α	2	3	10	49	8 N
Brightest of the Seven Stars	η	3	3	36	23	29 N
Bull's Eye, Aldebaran	α	1	4	24	16	6 N
Auriga's Shoulder, Capella	α	1	5	2	45	47 N
Orion's Left Foot, Rigel	β	1	5	5	8	26 S
Bull's North Horn	β	2	5	14	28	26 N
Orion's Left Shoulder, Bellatrix	γ	2	5	14	6	9 N
Orion's Girdle	ε	2	5	26	1	20 S
Orion's Right Should. Betelguese	α	1	5	44	7	22 N
Great Dog, Sirius	α	1	6	36	16	27 S
1st Twin, Castor	α	1	7	22	32	19 N
Little Dog, Procyon	α	1	7	29	5	44 N
2d Twin, Pollux	β	2	7	33	28	30 N
Hydra's Heart, Alphard	α	2	9	17	7	47 S
Lion's Heart, Regulus	α	1	9	58	12	56 N
Great Bear, Lower Pointer	β	2	10	50	57	27 N
Great Bear, Upper Pointer	α	1	10	51	62	50 N
Lion's Tail, Deneb	β	2	11	39	15	42 N
Great Bear's Tail, Alioth	ε	2	12	45	57	3 N
Virgin's Spike	α	1	13	15	10	7 S
Dragon's Tail	α	2	13	59	65	20 N
Boötes, Arcturus	α	1	14	6	20	14 N
Libra, South Scale	α	2	14	40	15	12 S
Libra, North Scale	β	2	15	6	8	38 S
North Crown	α	2	15	26	27	24 N
Scorpion's Heart, Antares	α	1	16	17	25	58 S
Hercules's Head, Ras Algethi	α	2	17	5	14	38 N
Head of Serpentarius	α	2	17	26	12	43 N
Dragon's Head, Rastaben	γ	2	17	52	51	31 N
The Harp, Lyra	α	1	18	30	38	36 N
The Eagle, Atair	α	2	19	41	8	21 N
S. Fish, Fomalhaut	α	1	22	47	30	41 S
Pegasus' Wing, Markab	α	2	22	55	14	7 N
Andromeda's Head	α	2	23	58	28	10 N

PART IV.

AN EPITOME OF ANCIENT GEOGRAPHY.

THE ancient Greeks and Romans were wholly unacquainted with the western hemisphere; and their knowledge of the eastern did not comprehend more than half of its surface. In Europe they knew little or nothing of Prussia, Sweden, Denmark, and Norway, a region which they denominated Scandinavia, and which they thought consisted of a number of islands. Russia, which they called Sarmatia, was equally unknown to them. In Asia they knew nothing north of the Caspian, but comprehended all the country under the general name of Scythia. The Ganges was the extreme boundary of their knowledge eastward. In Africa they knew nothing beyond the Mountains of the Moon, and were accurately acquainted only with the immediate coast of the Mediterranean, and banks of the Nile. The greatest extent of the earth as known to the ancients was from E. to W., hence the term *longitudo*, length, was applied to measurement in this direction, and *latitudo*, breadth, to measurement from N. to S. Their ideas respecting the figure of the earth were very defective. Most of them imagined it to be a flat round surface, which was surrounded by the ocean, out of which the sun and stars regularly rose, and into which they again descended. They represented the vault of the sky as resting on the tops of the highest mountains.

EUROPA.

INSULÆ BRITANNICÆ, the British Islands. Before the subjugation of England by the Romans it was irregularly divided amongst thirty tribes of barbarians, of whom the most considerable were the Belgæ in the west, the Brigantes in the north, the Silures in S. Wales, and the Iceni in Norfolk and Suffolk.

Islands.—Vectis, *Is. of Wight;* Cassiterrides, *Scilly Islands* and *Land's End.* Mona is the name given by Cæsar to the *Is. of Man;* Tacitus applies the same term to *Anglesea.*

Rivers.—Taměsis, *Thames;* Sabrīna, *Severn.*

Towns.—Londīnium, *London;* a place of considerable commerce even in the time of Tacitus. Eborăcum, *York*, where the emperors Sevērus and Constantius Chlorus resided, and where they both died; Rutupiæ, *Richborough*, celebrated for its oysters and as the general landing-place from Gaul; Camulodūnum, *Maldon*, the first Roman colony in Britain, and where the Romans were defeated by Boadicea; Venta (Belgarum), *Winchester;* Verolamium, *St. Albans*, the town of Cassivelaunus, taken by Cæsar; Aquæ Solis, *Bath;* Venta, *Caister*, near Norwich, the capital of the Iceni; Lindum, *Lincoln;* Deva, *Chester;* Danum, *Doncaster;* Pons Ælii, *Newcastle;* Luguvallium, *Carlisle*

GALLIA corresponds to modern France, with the addition of the county of Nice, the western half of Switzerland, and such parts of Germany and the Netherlands as are S. and W. of the Rhine.

Mountains.—Vogĕsus, *Vosges;* Cebenna, *Cevennes.*

Rivers.—Garumna, *Garonne;* Liger, *Loire;* Sequăna, *Seine;* Mosa, *Meuse;* Mosella, *Moselle;* Rhenus, *Rhine;* Rhodănus, *Rhone;* Arar, *Saone.*

Gallia, when invaded by Cæsar, was inhabited by three great nations, the Belgæ, the Celtæ, and the Aquitāni. The Celtæ were the most powerful, and gave name to the whole nation—the word Galli being the Latinized form of the native term, Gael. The Celtæ occupied the middle of the country, and were separated from their northern neighbours, the Belgæ, by the Seine, and from the Aquitani on the S. by the Garonne. Augustus subsequently made four divisions:—1. Gallia Belgica in the N.E.; 2. Gallia Lugdunensis, or Celtĭca, between Gallia Belgica and the Loire; 3. Aquitania, between the Loire and the Pyrenees; 4. Gallia Narbonensis, the S.W. district nearest to Italy. This, from having been the first province possessed by the Romans, was also called Gallia Provincia, from which the modern term *Provence* is derived. In the third and fourth centuries the four great divisions of Augustus were broken up into smaller ones. The country along the coast from the Loire to the Seine was called Armorĭca.

Towns.—In Gallia Belgica:—Colonia Agrippina, *Cologne*, called after Agrippina, the mother of Nero, who was born here; Itius Portus, *Wissant*, where Cæsar embarked on his second expedition into Britain; Ulterior Portus, *Calais;* Augusta (Trevirorum), *Treves*, frequently the residence of the emperors. In Lugdunensis, or Celtica:—Lugdunum, *Lyons*, the second city in Gaul, and the place where the governors of the whole country resided; Leutetia (Parisiorum), *Paris;* Bibracte, called afterwards Augustodūnum, *Autun*, where the nobility of Gaul were instructed in literature; Alesia, *Alise*, memorable for the sieges it sustained against Cæsar. In Aquitania:—Burdigăla, *Bordeaux*, distinguished for its literature in the decline of the empire. In Narbonensis:—Narbo, *Narbonne*, the metropolis of all

Gaul; Tolōsa, *Toulouse*, called also Palladia, from literature being there greatly cultivated; Nemausus, *Nismes*, a flourishing city; Massĭlia, *Marseilles*, noted for its learning and politeness of manners; Arelate, *Arles*, a favourite resort of the Romans, and styled Gallula Roma. the Rome of Gaul; Vienna, *Vienne*, the place to which Archelaus, surnamed Herod, was banished for his cruelties.

Tribes.—The Helvetii, a powerful race, frequently mentioned by Cæsar, occupied the district between Lacus Lemānus, *L. of Geneva*, and Lacus Brigantinus, *L. of Constance;* the Sequăni were to the W. of the Helvetii.

GERMANIA, bounded on the N. by Sinus Codanus, *Baltic*, W. by the Rhine, S. by the r Danubius, *Danube*, E. by the r. Vistula.

The principal rivers besides those already named, are the Albis, *Elbe*, and Viadrus, *Oder*. In the south was the celebrated Hercynia Sylva, *Hercynian Forest*, which it took Cæsar nine days to cross, and which extended northwards to an unknown extent. The chief towns cannot be ascertained. The principal tribes inhabiting the country were, the Batăvi, in Holland; the Frisii, in Friesland; the Chauci Minores and Majores (distinguished by Tacitus as the most noble and just of all the German nations,) in Oldenburg and Bremen; the Saxones, the ancestors of the English, at the mouth of the Elbe. The Cherusci were to the south of the Chauci; they, under the conduct of Arminius, defeated and slew three Roman legions, commanded by Varus, but were afterwards defeated by Germanicus; the Catti, a powerful nation, called by Cæsar Suevi, were situated in Hesse: the Hermandūri, in Franconia; Marcomanni, in Bohemia. The whole coast of the Baltic was occupied by various tribes of the Vindili, *Vandals*, the most celebrated of which were the Longobardi, who afterwards settled in Lombardy; the Burgundiones, who emigrated to Burgundy, and the Gothones, *Goths*. The Alemanni were not a single tribe but of a confederation (as the name *All men* indicates); they are first mentioned in the third century; from them Germany derived the appellation of Allemagne. The Franks were a Teutonic race, who, on the breaking up of the empire, invaded the northern parts of France: they are not mentioned in classical writers. The Salic law, which excludes females from the throne of France, was established by the Salii. the most powerful of the Frank tribes.

VINDELICIA, NORICUM, RHŒTIA, PANNONIA, and ILLYRICUM occupied the region south of the Danube, exclusive of Italy and Greece.

Rivers.—Ænus, *the Inn;* Savus, *the Save.*

Towns.—Augusta (Vindelicorum), *Augsburg;* Tridentum, *Trent;* Vindobona, *Vienna.*

Hispania consisted of the modern Spain and Portugal.

Mountains.—Pyrenæi, *the Pyrenees;* Idubĕda, the summit of which gives rise to the Douro, Tagus, and Guadalaviar; Herminius, between the Tagus and Guadiana; Mariānus, *the Sierra Morena* and Orospĕda, the eastern extremity of the same range.

Rivers.—Durius, *the Douro;* Tagus; Anas, *the Gaudiana;* Bœtis, *the Guadalquiver;* Ibērus, the Ebro; Minius, *the Minho,* so called from the vermilion found in its neighbourhood.

Capes.—Promontorium Artăbrum, *C. Finisterre;* Pr. Sacrum, *C. St. Vincent,* called by Strabo the most western part of the habitable globe; Calpe, the rock of *Gibraltar,* which, with Abўla on the African side, formed the Pillars of Hercules.

Divisions.—Spain was at first divided into two provinces; Hispania Citerior, nearer, and Hispania Ulterior, further Spain. In the time of Augustus, Hither Spain was named Tarraconensis, from Tarraco, its capital; and Further Spain was divided into Bœtica and Lusitania.

Amongst the tribes were the Cantăbri, on the Bay of Biscay, a fierce and warlike race, subdued by Augustus, and the Celtibēri, in New Castile and Aragon, the most powerful of the native tribes, and remarkable as being the first mercenaries employed by the Romans.

Towns.—Tarrăco, *Tarragona;* Carthāgo Nova, *Carthagena;* Toletum, *Toledo;* Saguntum, *Murviedro,* (*mures veteri,* old walls,) the destruction of which by Hannibal gave rise to the second Punic war; Numantia, near the source of the Douro, which, for 14 years, resisted the Roman arms; Gades, *Cadiz,* a great commercial city, founded by the Phœnicians; Portus Calle, at the mouth of the Douro, of which "Portugal" is the corrupt pronunciation.

Italia took its name from a native prince called Itălus.

Seas and Gulfs.—Hadriaticum Mare, *G. of Venice;* Tarentīnus Sinus, *G. of Taranto;* Siculum, or Etruscum Fretum, *St. of Messina;* Tyrrhenum, or Infĕrum Mare, a name applied to that part of the Mediterranean that waters its west coast.

Mountains.—The Alpine range in the neighbourhood of the sea was named Alpis Marĭtima, further north Alpis Cottia, then A. Graia and A. Pennīna, *Little* and *Great St. Bernard;* Alpes Rhœticæ, in Rhœtia; and Alpes Carnicæ, or Juliæ, on the borders of Noricum. The Apennines retain their ancient name.

Rivers.—Padus, or Eridănus, *the Po;* Tibĕris, *the Tiber;* Athesis, *the Adige;* and the small but celebrated Rubico, *Fiumicino.*

Divisions.—The northern part between the Alps and the Rubicon was regarded in the time of the republic only as a colony; it consisted

place of Virgil; Verona, the birth-place of Catullus
Pliny; Patavium, *Padua*, the birth-place of Livy; Had
name to the Adriatic; Felsina, afterwards Bononia,
brated for a port and arsenal made here by Augustus, a
having been the residence of the emperors of the west, w
possessed by the barbarians; Genua, *Genoa*, an extremel
Augusta (Taurinorum), *Turin*, taken and plundered b
his descent into Italy.

The principal countries in Central Italy were, Florenti
capital, Etruria or Tuscia, Umbria, Picenum, Sabinum, L
nia, and Samnium. The principal towns in Etruria were
rival of Rome, captured by Camillus, after a siege of te
Pisa; Perusia, *Perugia*, near the lake Thrasimēne, w
obtained his third victory over the Romans. In Umbria
Spoleto, where Hannibal was repulsed. In Picenum w
ceiving its name from the *elbow*-like flexure of the coas
situated. Sabinum was the native territory of the S
enemy of the Romans; in it was Cures, *Correse*, the
Numa, from which the Romans received the name of
east of Cures was Horace's Sabine farm. Latium wa
portant division of Italy. On the Tiber, fifteen
mouth, was Rome; the seven hills on which it was b
Capitolīnus, on which stood the Temple of Jupiter Cap
Palatinus, containing the palace of Augustus; Mons A
Coelius, Mons Esquilīnus, Mons Viminālis and Mons

On the coast, at the mouth of the Tiber, stood Ostia n and Pompeii. Here also was the luxurious city, Capua, which nished so severely for its revolt in the second Punic war; and , on the sea-coast, the residence of a sibyl. The southern por- Italy was called Magna Grecia, from the number of the Grecian es it contained. It comprised Apulia, Lucania and Bruttium. hief places of interest here were, Brundusium, *Brindisi*, the prin- ort for the passengers from Greece to Italy; Tarentum, *Tarento*, d by the Lacedemonians; and Cannæ, so fatal to the Romans dreadful battle against Hannibal. The large islands of Sicilia, ia, and Corsica were regarded as Roman colonies.

ÆCIA.—The most general name for Greece among the natives elves was Hellas. It was bounded on the north by Macedon.

s and Gulfs.—Ægeum Mare, *the Archipelago;* Saronĭcus Sinus, *of Egina;* Argolĭcus Sinus, *G. of Napoli;* Laconĭcus Sinus, *Kolokythia;* Messeniăcus S., *G. of Koron;* S. Corinthiacus, *Lepanto.*

isions.—Greece may be divided into three parts.—I. Northern e, containing Thessaly and Epirus. In Thessaly are the tains, Olympus, the fabled abode of the gods; Ossa, Pelion, and s, and the plain of Pharsalia, where Cæsar overcame Pompey. a was its capital. In Locris is the pass of Thermopylæ. — II. al Greece, which comprises Attica, Megăris, Bœotia, Phocis, s, Daris, Ætolia, and Acarnania. In Attica was Athens, and the of Marathon; in Bœotia, Thebes, the birth-place of Pindar; in is, the mountain Parnassus, the resort of poets; and Delphi, famous s games, and the oracle of Apollo.—III. The Peloponnesus, *a*, containing Achaia, originally called Ionia, Sicyonia, Corinthia, Arcadia, Argolis, Messenia, and Laconia. The principal cities s region were Corinth and Sparta, or Lacedæmon.

LYRICUM, DACIA, MÆSIA, MACEDONIA and THRACE were to the Greece, and form the northern part of Turkey in Europe.

as, &c.—Pontus Euxenus, *the Black Sea;* Bosphŏrus Thracius, *the f Constantinople;* Propontis, *the Sea of Marmora;* Hellespontus, *ardanelles*, so called from Helle, the sister of Phryxus, who was ned in it.

wns.—Pella, the native city of Philip and Alexander; Beræa, *feria;* and Thessalonĭca, mentioned in Scripture; Adrianŏpolis, yzantium, *Constantinople*, which became the capital of the Roman ire, A.D. 328.

ASIA.

Asia Minor consists of the Peninsula between the Euxine and Mediterranean seas. It contains,

1. Three countries towards the west; Mysia, Lydia, and Caria. The principal towns in this division were the sea-ports, Phocæa, Ephĕsus, Milētus, Smyrna, and Halicarnassus; inland were the towns of Sardis and Thyatira in Lydia, and Pergamus in Mysia, afterwards celebrated for its library and the invention of parchment (*membranæ Pergamenæ*).

2. Three towards the south, Lycia, Pamphylia, and Cilicia, with its capital, Tarsus.

3. Three towards the north, Bithynia, Paphlagonia, and Pontus. On this coast were the ports Heraclēa, Amīsus, and Sinōpe.

4. Three inland, Galatia; Phrygia, in which were the cities of Laodicēa and Colossæ; and Cappadocia.

Syria; Phœnicia and Palestine were on the eastern shores of the Mediterranean, to the south of which was Arabia; and to the east, Mesopotamia, Armenia and Babylonia. Of these Palestine alone will require minute description.

Palestine, or the Holy Land, was so called from the Philistines, a warlike people, who migrated from Egypt before the time of Moses, and settled in the south-western part of the country. Its original inhabitants were the descendants of the youngest son of Ham, from whom it received the name of Canaan. After its occupation by the Israelites, and allotment amongst the twelve tribes, it was called the Land of Israel.

Under the sway of the Romans, the country west of the river Jordan was divided into three provinces, Galilee, in the north, Samaria, in the middle, and Judæa in the south. The region beyond Jordan comprehended Batanea, Perea, and several other minor districts.

1. Galilee extended from the mountains of Lebanon, on the north, to Carmel, on the south-west. Its population in the time of our Saviour was slightly intermixed with Greeks and Syrians, and spoke a dialect somewhat different from that of Judæa. For these reasons, as well as their distance from Jerusalem, the inhabitants were slighted by the Jews. Jesus spent most of his life in this province. He resided at Nazareth, *Nazera;* performed his first miracle at Cana; restored a widow's son to life at Nain; and often visited Chorazin, Bethsaida, and Capernaum, "his own city," fishing towns situated on the Lake of Tiberias. The town of Tiberias, *Tabaria,* is still a place of some importance; it stands on the margin of the lake, which is also indifferently called the Lake of Gennesareth, the Sea of Galilee, and the Sea

of Cinneroth, from localities on its shores. At no great distance from Tiberias, Mount Tor, or Tabor, where Jesus was transfigured, rises from the plain of Esdraelon.

The territory stretching along the coast was assigned as a portion to Asher, but that tribe was never able to expel the Phœnicians from the north. The principal towns were Sidon, *Saide*, noted for its manufactures and commerce; Zarephath, or Sarepta, where Elijah raised the widow's son; Tyre, *Sour*, called "The Daughter of Sidon," because founded by a colony from that city; and south of these, Accho or Ptolemais, *Acre*, the key of Syria, on a semicircular bay; the opposite extremity of which is formed by Mount Carmel. Near Acre is the river Belus, from the sands of which glass was first made.

The Bay of Acre receives the waters of the river Kishon, memorable for the destruction of Sisera's host. At the further end of the bay stood Porphureon, famed for the fish which produced the well-known Syrian dye. Carmel, once the retreat of Elijah, terminates in a flattened cone, 2000 feet high, the boldest promontory on the coast of Palestine, and extends a distance of eight miles to the plain of Esdraelon.

Dan, and Cæsarea Philippi, or Baneas, probably occupied sites, not far distant from one another, at the foot of Mount Lebanon, or Libănus, near the sources of the Jordan: Baneas retains its ancient name, and is situated above Lake Samachonitis, the Waters of Merom.

2. Samaria included the possessions of Ephraim and Manasseh, west of Jordan. When the ten tribes were carried captive, it was peopled with Assyrians. (2 Kings, xviii. 24.) Hence arose the enmity between the Jews and Samaritans. The chief city, Samaria, named Sebaste, *the Venerable*, in honour of Augustus Cæsar, now *Sebastich*, was built by Omri, the father of Ahab, who made it the capital of the kingdom of Israel. Here Elijah and Elisha prophesied, and John the Baptist was beheaded. It stands on an insulated hill, surrounded by a deep valley. A magnificent colonnade, supposed to be the remains of Herod's palace, stands on the southern declivity. Shechem, *Naplous*, is delightfully situated in the valley of Sychar, between the mountains of Gerizim and Ebal —the highest in Samaria. The sepulchre of Joseph, and Jacob's Well, are still pointed out to the traveller. A remnant of the Samaritans continue to practise their ancient national observances. The ruins of a monastery mark the site of Bethel, to the south of Shechem. Cæsarea, *Kissary*, the city of Herod and the residence of the Roman governors of Palestine, was situated on the coast. Here St. Paul was a prisoner, and defended himself before Agrippa and Felix. Its harbour was favourably situated for trade, but incommodious; the Apostles often sailed from it for Greece. It is now a heap of ruins. The Plain of Sharon, celebrated for its beauty, lay between Cæsarea and Joppa.

3. Judæa, the southern division, extended to the lower extremity of the Lake Asphaltites, the Dead Sea, on the east, and the river of Egypt, upon which *El Arisch* is situated, on the west. Jerusalem, the capital, was built on four hills—Mount Zion, on which the palace of David and the Tabernacle stood; Mount Moriah, where Isaac was to have been offered, and where the Temple of Solomon was afterwards built; Mounts Bezetha and Ascra. Calvary is in the western quarter of the modern city; it was anciently without the walls. The Mount of Olives lies on the east side, and is reached by crossing the Valley of Jehoshaphat, through which the brook Kedron flows southward. A road leading from the eastern gate of the city to the villages of Bethphage and Bethany, passes the Garden of Gethsemane, the scene of our Saviour's agony. Bethlehem, his birth-place, is six miles south of Jerusalem. Tekoa, where Amos prophesied, lay beyond it, in the same direction; and still further south, in the hill-country of Judæa, is Hebron, which contains the tombs of Abraham and Sarah, within a mosque built over the cave of Machpelah.

The Wilderness of Judæa, commencing near Jericho, stretched along the shores of Jordan and the Dead Sea to Hebron.

Joppa, *Jaffa*, the nearest sea-port to the Holy City, is said by Pliny to have existed before the flood. It is celebrated as the place to which the materials of the Temple were brought from Lebanon, where Jonah embarked for Tarshish, and Peter restored Tabitha to life. Arimathea, *Ramla*, is situated between Jaffa and Jerusalem.

Philistia, the country of the Philistines, occupied the rest of the southern coast. Its chief towns,—Asdod, Azotus, *Edzoud*, one of the five satrapies of the Philistines, and famed for the Temple of Dagon, stands on a hill, twelve miles from Jaffa. Ekron, *Tookrair*, and Gath lay at a short distance.

The ruins of Ascalon, a flourishing city during the Crusades, occupy a strong position on a rocky ridge near the sea shore. Gaza, from which Sampson carried off the gates, crowns the summit of a hill.

Beersheba and Kadesh Barnea lay near the southern frontier of Judæa; the latter interesting as the place from which spies were sent to explore the Promised Land, and from which the Israelites recommenced their wanderings in the Wilderness.

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